

THE MAGAZINE OF
Fantasy AND

Science Fiction

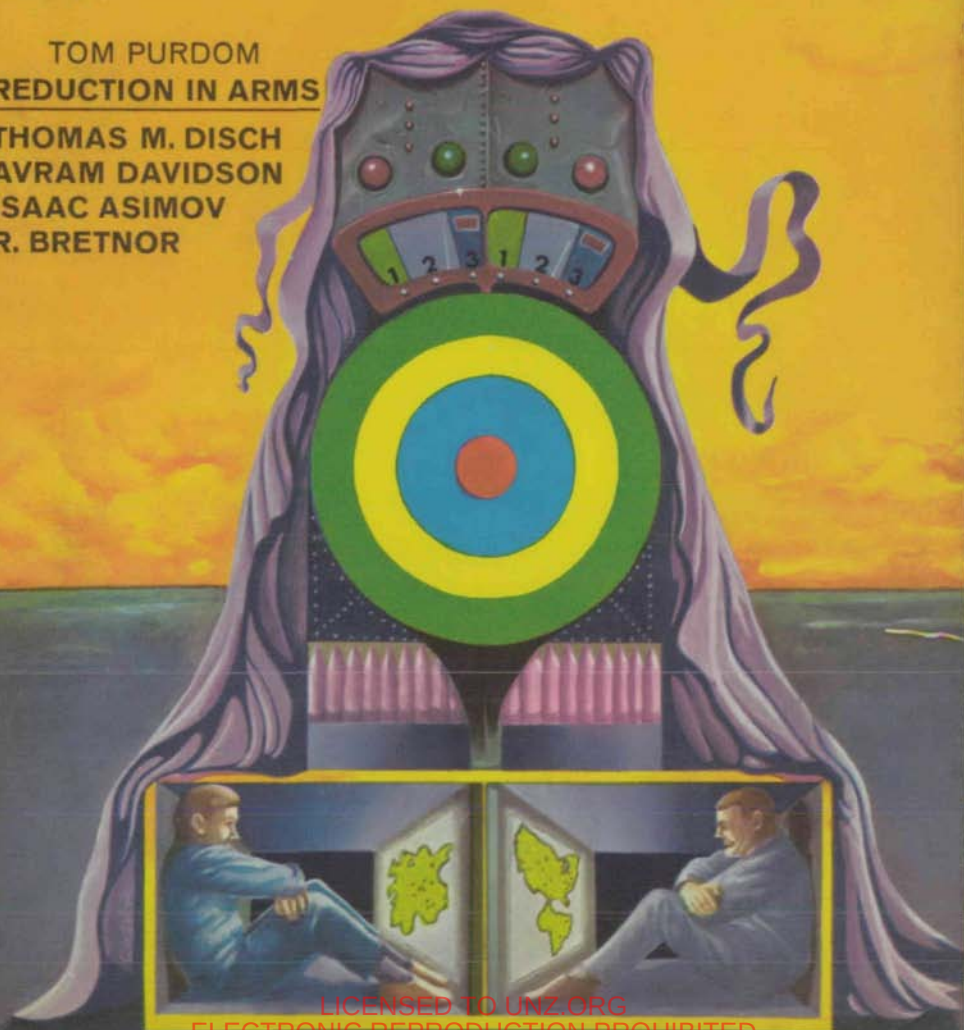


AUGUST

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TOM PURDOM
REDUCTION IN ARMS

THOMAS M. DISCH
AVRAM DAVIDSON
ISAAC ASIMOV
R. BRETNOR



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Fantasy and Science Fiction

AUGUST *Including Venture Science Fiction*

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The idea that nations could relax between wars perished somewhere in the radioactive dust over Hiroshima; there's little left of the spirit expressed by Drake when he said, "There's time to finish this game of bowls and beat the Spaniards too." Nations now prepare in peacetime for a war which may be over in a week, and preparation means arming. This is a story about one direction the arms race may take (and not primarily a discouraging one). It captures perfectly the complex, high-level tensions of the Cold War and, equally important, does so in terms of a highly personal, highly exciting story.

REDUCTION IN ARMS

by Tom Purdom

THE TIP THAT GOT US INTERESTED in Dr. Lesechko came into Washington from one of our volunteer undercover inspectors, a math teacher from Amarillo, Texas, who was spending a year in the Soviet Union as part of the expanded cultural exchange program. One of our psychologists had planted a file^o of one thousand names, faces and biographies in her unconscious mind just before she had left the United States in July, and one night in late September she saw Dr. Lesechko and a girl carousing in a restaurant thirty kilometers from the hospital in which Dr. Lesechko was supposed to be a seriously ill mental patient. A name, a picture, and a set of in-

structions popped into her mind, and she passed the information on to the nearest U.S. consul and gave me the kick in the teeth I had been waiting for ever since I had been appointed Chief of Inspection—the first serious evidence that the Treaty of Peking was the Communist trick all our opponents insisted it had to be.

By itself, of course, the sighting was meaningless. Our undercover inspectors would have been useless without the other secret weapon in our inspection system: a biochemical computer—the biggest in the world at that time—in which we had been filing everything we knew about the Chinese and Soviet blocs and the other nuclear

powers. We didn't know something important had happened until a typewriter clattered in an office on the top floor of the computer building, and an intelligence analyst discovered he had a new inconsistency to check. The most promising biochemist in the 1978 graduating class at Leningrad University was not where the official records of the Soviet Ministry of Health said he was supposed to be.

Copies of the analyst's report came into the appropriate offices at the Central Intelligence Agency and the Arms Control and Disarmament Agency marked with a large red URGENT. At ACDA they didn't waste any time bringing it to me.

I read it with my stomach turning over. The strides genetics and biochemistry had taken in the last fifteen years had been one of the main reasons we had insisted that open laboratories had to be part of any treaty to reduce armaments. We were especially worried about a little item the military analysts had dubbed the "ninety-five plus" virus—a disease which could spread so secretly and rapidly the victim nation couldn't possibly develop an immunization (or launch a retaliatory nuclear strike) until ninety-five percent of its population had been killed. Nature and modern medicine had made a virus that lethal a difficult problem—for reasons you will still find in any

good textbook on pathology—but at least eight nations had been working on it when we ratified the treaty. Given a brilliant researcher and the new experimental animals Petroyev had just developed at Leningrad University, ACDA's Bureau of Evasion Tactics estimated a secret laboratory could develop a virus in eighteen months or less. The mental hospital in which Lesechko was supposed to be a patient was big enough to house the project on any three floors—and he had been there one year.

My impulse, naturally, was to send a lab inspection team directly to the hospital. I was responsible for the safety of two hundred million people, and I had been working for the Arms Control and Disarmament Agency for fourteen long, frustrating years. If the people I was responsible for were in danger and my life's work was a failure, I wanted to know it right away. If I have to choose between living with an unpleasant truth and living with a question mark, I'd rather live with the unpleasant truth.

If we treated the inspection as if it were something special, however, the Russians would know we were suspicious and would probably destroy anything they might be hiding. I would have to send a team big enough to inspect all twenty-two floors simultaneously. And even that might not be

enough. As Evasion had reminded me several times, a determined evader could always blow a site up and make it look like an accident.

I organized a standard lab inspection team instead—one ACDA inspector, one CIA agent, and one biochemist from our per diem consultant list. The Moscow embassy was to issue them a Class A command car—the same kind of hovercar the Army used for a mobile battle group command post—and they were to make a routine, random tour of declared facilities. When they got to the hospital, hopefully, it would look like a routine stop in a journey which hadn't even been planned in advance.

For the ACDA inspector I picked one of the best men on our inspection staff, a young Ph.D. in psychology named Jerry Weinberg. Weinberg spoke Russian fluently—he had been studying it since he was in the first grade—and I had been impressed by his thinking procedures when I interviewed him. He was one of our best human lie detectors, too. According to the tests we gave all our inspectors, he was right ninety percent of the time when he guessed a subject was lying, and seventy percent of the time when he guessed a subject was hiding something. Personnel thought that was phenomenal. Apparently psych training usually dulls the intuition.

Dr. Richard Shamlian of Boston University agreed to fill the scien-

tific slot, and the CIA told us they were sending a veteran agent named Justo Prieto. For eight days I watched the light which represented Weinberg's team creep toward the mental hospital on the big map we used to keep track of our inspectors.

Office hours in the Soviet Union occur during the hours sane people in the United States are home in bed or out enjoying themselves. I had thought about that now and then during the Peking Conference, but I obviously hadn't fully understood what it meant; if I had, I would have been as stubborn as the European and Chinese negotiators put together. When Weinberg called Washington from the mental hospital, it was two p.m. where he was, and I was sitting in a booth in the monitoring room staring at a clock which insisted on reminding me it was only five a.m. on the eastern coast of the United States.

As usual, two cars loaded with Russian secret police had followed the team all the way. Weinberg had made a sudden turn about eighty kilometers from the hospital, however, and he had managed to drive up to the main entrance only an hour after the Russians could have known the hospital was his objective. The team had waited around in the lobby for five or ten minutes after Weinberg had flashed his credentials at the secu-

rity guard on duty, and then the Assistant Director, Mr. Boris Grechko, had come out of his office and greeted them with great enthusiasm.

They were the first inspection team Grechko had met, it seemed, and he felt the Treaty of Peking was one of the great events in the history of the human race. It was too bad Dr. Rudnev, the Director, had left for the day. Dr. Rudnev had broken into tears the day the treaty had been announced.

Grechko would be happy to show them around, however. He could show them everything but the top eight floors. All the patients on those floors, Dr. Lesechko included, were receiving programmed environment therapy. Rudnev was the only man who could take the inspectors through without wrecking all the progress the patients had made. Dr. Rudnev worked late most nights, poor fellow, and he usually took off one afternoon a week to relax. This just happened to be the afternoon.

I leaned back in my swivel chair and studied the doodles I had been making while Weinberg talked. I had put the picture from the command car on the twenty centimeter screen in the middle of my console, and I could feel the eyes and the brain behind Weinberg's sun glasses evaluating me as I thought. His IQ was about twenty points higher than mine, and I knew he had spent a lot of his

spare time studying military history and international politics. I was pretty certain he wasn't going to do research in psychology when he finished his three years with us. He was probably headed for a job with some foundation or non-profit corporation where they would pay him to sit around and think about what the people in the government should be doing. He was the type and the bug had obviously bitten him. Someday he might even find himself on my side of the desk.

"Do you think Grechko's telling the truth?" I asked.

"It feels funny," Weinberg said. "I wouldn't stake my life on it, but I don't feel convinced."

"How can Rudnev take you through without ruining the programmed environments? I thought once you started a programmed environment you couldn't interrupt it for anything."

"It's up to Rudnev. Some psychiatrists won't do it under any circumstances, and some will do it now and then for training purposes. It's a tricky question. Nobody really knows what's right when you've got a technique this new. I asked Grechko if Rudnev had ever taken anybody through before, and he hesitated just a fraction of a second and said "no."

"Where's Rudnev supposed to be now?"

Weinberg smiled. "Grechko says he doesn't know. He usually

goes for a long drive and then takes his wife out in the evening."

I grunted. "Have you asked anybody else in the hospital if Dr. Rudnev does this every week?"

"I asked the security guard in the lobby and Grechko complimented me on my thoroughness."

I grunted again. If they were hiding a clandestine lab in the hospital, somebody had obviously picked up a good tip from the *Congressional Record*. It looked like it was going to be exactly the kind of situation Senator Moro had harassed us about when the Senate had been considering the treaty.

Theoretically every military and scientific installation in the world could be visited by our inspectors at all times. Eight times a year, furthermore, at any time we chose, we could inspect any site which aroused our suspicions. In practice, however, there were bound to be sites which couldn't be inspected under any circumstances. What would we do then?

Our only answer had been the escape clause. Either we would negotiate some satisfactory resolution when such situations occurred or we would abrogate the treaty. To keep the treaty as flexible as possible, we hadn't even included any formal procedure for negotiating. In a world where radical technical change is the norm, we had felt, rigid political procedures are a dangerous mistake.

But that meant we had to feel our way along every time we ran into a problem. We had to keep balancing the military security of the United States against the value of the first inspected arms reduction in the history of the world.

If I told Weinberg to insist on the letter of the treaty and inspect the site at once, and the team discovered Grechko was telling the truth. . . . Even if the Soviet Union didn't withdraw from the treaty in anger, it would be difficult to order an inspection the next time a government made such an objection—and every government in the world would know it.

There was one possibility I had to keep in mind at all times. Instead of a plot to evade the treaty, we might be faced with a plot to wreck it or weaken it. We didn't think the Russians knew about our undercover inspectors, but things like that have a way of getting out sooner or later; Dr. Le-sechko could have been planted in a restaurant to arouse our suspicions—a drugged mentally ill person could probably be manipulated to look like he was drunk and boisterous—and someone might be hoping I would send our inspectors trooping through the upper floors and wreck the lives of the patients up there for nothing.

Even if the people in charge in the Kremlin wanted the treaty as much as I did, they couldn't exercise absolute control over their

subordinates. We were having trouble with people in the CIA and the Pentagon, and they had their hard-liners, too. Sooner or later somebody in the lower echelons was bound to set up a booby trap. If we let them trick us into an inspection which ended in disaster, it would be so easy to put us off that in the future inspection would become a farce, and we would probably have to abrogate the treaty ourselves.

On the other hand, of course, if they did have something hidden in the hospital and I let them stall us, they might use the time to get rid of the evidence. Evasion had calculated it would take five days to move a laboratory big enough to develop a ninety-five plus virus, and at least a day to destroy it without leaving a telltale mess, but that's the kind of calculation wise men forget as soon as they hear it. Whenever somebody on your side proves the enemy can't possibly do something, there's a very good chance the enemy is already developing a way to do it.

"Tell them we want to seal off the hospital until we contact Rudnev," I said. "Anybody can come in but nobody leaves until one of your men searches him. I'll send you six reinforcements right away. You'll be short-handed, but I don't want to put too many people on this yet. They still probably don't know we're especially suspicious. If they are evading, they

may think there's still a chance they can talk us into going away."

Weinberg looked thoughtful. I would have given a great deal to know if he approved or disapproved, but I couldn't bring myself to ask. "I'm doing everything I can to make it look like we dropped in on the spur of the moment," he said. "Grechko looked like he really was surprised to see us."

"That's fine," I said. "Don't let anybody leave that place until you're certain they don't have a thing on them—microfilms, samples, anything. If they don't want to be searched, they'll just have to stay there until we get this thing settled. We're taking a risk and I'm counting on you to keep it to a minimum."

"Don't worry," Weinberg said. "If I let anybody slip past me, Justo Prieto will grab them."

"How are you and Mr. Prieto getting along?"

Weinberg shrugged. "He hates the Russians and he probably hates me, too, but so far he's been civil. His Russian is so poor I don't think the Russians know how he feels. He only learned it six months ago, and I think he's got a block against it."

"Keep an eye on him, too," I said. "We still don't know much about him, but he looks like he may be exactly the kind of agent Senator Moro hoped the CIA would send. Let me know right away if you have any trouble."

We signed off and I slumped over the console and went over the whole thing again. Every decision I made had implications which should have paralyzed me. We were moving through unexplored country, and we had to pick our way along step by step.

I called the embassy in Moscow, and the Chief of Inspection for the USSR gave the Soviet Foreign Ministry the good news. The people at the Foreign Ministry who were in charge of relations with arms control inspectors were very polite and understanding, and they assured us they would do everything they could to reach Dr. Rudnev. In the meantime they would telephone the hospital at once and ask the staff to give our inspectors complete cooperation. Semyon Novikov, a diplomat who had been one of our favorite Russians during the Peking Conference, would be on his way to the hospital to help smooth things over as soon as he could get his bags packed.

I put my chief assistant in charge of the monitoring booth and returned to my office and dictated a memo to Ralph Burnham, the Director of the ACDA. Burnham got the tape at a U.N. meeting he was attending in New York and called me while I was eating lunch at my office. He approved of my decision, but he had contacted the White House before he called me, and the President wanted any dis-

turbance at the hospital kept to a minimum. If we entered the site and discovered a violation, we were to keep it a secret and let State take it from there. The President expected to win the election but he was running scared. The continuous deep-probing poll his campaign staff was using indicated twelve percent of the people who were going to vote for him were only mildly committed. They would stampede to the opposition overnight if anything assailed their fears more than Senator Moro was assailing them already. If we discovered a violation before election day and the news got out, the President and the treaty were both dead.

At ten p.m. at the hospital, one p.m. in Washington, the day shift at the hospital went home, and the inspectors searched everyone for hidden records and equipment. It took three hours and there was a lot of grumbling.

At two a.m. at the hospital, five p.m. in Washington, Weinberg and his men settled down to the dreary rhythm of guard duty. The Soviet Foreign Ministry still claimed it was looking for Dr. Rudnev. They had phoned his apartment and sent a man to knock at his door, but no one had answered. In the towns around the hospital the local police were searching the restaurants and theaters.

I called my wife to tell her I

wouldn't be home and sprawled on a cot to sleep.

My assistant woke me up at midnight. Dr. Rudnev had returned to the hospital at eight-thirty a.m. hospital time—he claimed he and his wife had spent the night at a lakeside lodge sixty kilometers from the hospital—and Weinberg and Novikov had been talking to him for half an hour. He refused to escort the inspectors through the programmed environment wards. The treaty was important to him, he claimed, but he was a doctor and the welfare of his patients came first. Other psychiatrists might be willing to interrupt a program, but he refused to take the risk. The papers he had read indicated several potentially curable patients had been permanently damaged by psychiatrists who interrupted their programs.

Most of the senior people in my bureau were standing by in their offices. I flashed everybody who might be relevant, and we got together in the conference room and spent an hour and a half looking for a way out. We even considered flying in enough American psychologists to put one American role-player in every programmed environment in the hospital. It would have cost the government thousands, but we all knew the President would get us the money if it would save the treaty.

Unfortunately it was impossi-

ble. We always came back to the same problem. If we did anything like that, the Russians would be in control of the inspection. Conceivably they might even move lab equipment from room to room as our inspectors went along with Dr. Rudnev's programs.

We had to think about safety margins, too. To be successful, lab inspections had to take place with the minimum possible notice. They could destroy laboratory equipment and laboratory records, but we couldn't destroy the information in Lesechko's head. I would have insisted on immediate access, in fact, if we hadn't been certain they didn't know we were especially interested. As it was, now that we were there, we couldn't give them more than a few days to study the situation. When your opponent has a static situation to attack, and all the resources of a modern society at his disposal, you have to assume he can knock down any barrier you put up if you give him enough time.

At three a.m. I got on a three-way hookup with Dr. Rudnev and a high ranking assistant to the Soviet Foreign Minister, and we tried some high-level persuasion. I didn't think it would do much good, but I wanted to get a look at the people I was dealing with before I called Burnham and recommended that we use one of our unrestricted inspections.

Dr. Rudnev was a stout, spec-

tacted man who probably looked pleasant and easy going most of the time, but the situation had made him angry and uncomfortable. For a man trained in all the checking, cross-checking and skepticism which are a necessary part of science, he was unreasonable in a very suspicious way. He kept getting angry because I was doubting his word. Nothing I could say could convince him. I didn't distrust him any more than a man in my position had to distrust everybody.

"I will not sentence twenty-six human beings to a lifetime of insanity," he kept saying. "If I let your inspectors blunder through those floors wrecking the programs, I'll have destroyed the last hope some of those patients have. We aren't hiding anything. We believe in the treaty as much as you do. Why should I want to wreck a treaty that's given the government enough extra funds that it can add twenty percent to my budget?"

We went round and round the same arguments for at least half an hour before we all got so frustrated and impatient that I decided I'd better give up before somebody created an international incident. The Russian diplomat apologized to me for the trouble we were having, and I told him it was all right and assured Dr. Rudnev we understood his position.

"I'm certain there's a solution to this," I said. "I'm sorry we've had

to bother you, Dr. Rudnev. I'll talk to my superiors, and we'll try to work something out that will satisfy all of us."

Weinberg returned to the command car, and I talked to him over our private, scrambled hook-up. He had been watching while I was talking to Dr. Rudnev. "What do you think?" I asked. "Are they telling the truth?"

"There's something wrong with both of them," Weinberg said. "Grechko's too smooth and Rudnev's too excited."

"What about Novikov?"

"He seems all right. I think he's just as worried about the treaty as we are."

I added a few triangles to my doodles. I had already made up my mind, but I still had to hesitate a second.

"I'm going to recommend an unrestricted inspection," I said. "Be ready to go in."

"What if they try to stop us?"

I hesitated again. "Be prepared to force your way in. I don't know if the President will tell you to, but be ready. Don't let anybody you've got there leave the site for anything. If anything does happen, we don't want it to go any further from the hospital than it has to. Nobody you've got there is to talk about this with anybody from outside the site. If Prieto or anybody else disobeys, they're breaking security. Put them under arrest and keep them under guard."

"Anything else?"

"How are you fixed for supplies? Can you eat and sleep there for several more days?"

"Novikov had them put all the facilities of the hospital at our disposal. They may try to poison us, but they won't starve us to death."

I smiled. "Make sure you get served out of the same kettle as everybody else."

I called Burnham's hotel suite in New York, and the President talked to both of us as he flew back to Washington from a campaign speech in Denver. We assumed the Russians would deny us access, and we would have to negotiate with them. Before the negotiations began, we had to let them know we would withdraw from the treaty if they destroyed the lab while we were negotiating and tricked us into inspecting real patients. If they wanted to keep the treaty, they could either prove no lab had ever been hidden in the hospital—let their technical staff and ours figure out how—or they could show us the lab and give us all the information Lesechko had obtained.

Dr. Rudnev turned livid when Weinberg formally demanded access under Article VI. He slammed down an alarm button and hospital security guards scurried to every elevator and passageway in the place.

"We'll guard our patients with our lives," Rudnev yelled. "Go near

those floors and we'll shoot to kill."

We notified the Soviet Foreign Ministry at once. "This is the first time any inspector has been threatened," Burnham told the Assistant Foreign Minister in charge of relations with arms control inspectors. "I realize Dr. Rudnev is under exceptional emotional pressure, but this is a challenge to the entire concept of inspection. I have to tell you we consider this the most serious disagreement since the ratification of the treaty."

Phone calls buzzed between Moscow and Dr. Rudnev. Weinberg reported Novikov was doing everything he could to keep everybody calm and make sure nobody got rattled and started shooting. I looked over the plotting board and sent five more inspectors moving toward the hospital.

Burnham arrived in Washington by helicopter just before dawn, and I stood behind him and listened while he and the Assistant Foreign Minister had another talk. The Foreign Ministry now wanted to know why we had to inspect the upper floors. Their talks with Dr. Rudnev, they claimed, had convinced them his objections had some validity.

"In cases such as this," the Assistant Foreign Minister said, "we feel that the inspecting country must offer the host country some reasonable evidence that an illegal facility may be hidden on the disputed site. Why should the welfare

of so many patients be endangered by a routine inspection? The Foreign Minister wishes to point out that inspection itself could be used as a weapon to disrupt morale and efficiency."

I went back to my office and took a nap. The White House was in charge now. They would call me if they needed me.

At twelve thirty a.m. the next evening, hospital time, a car turned off the highway and rolled up the driveway toward the main entrance. The Russian guards at the foot of the hill waved it on after an animated discussion with the two men inside, and the American inspector halfway up stopped it again and passed the buck to the inspectors posted in front of the main entrance. The driver claimed they were there to see a psychiatrist who was an old friend of theirs. They had driven ninety kilometers out of the way and then discovered that their friend was on the night shift.

Prieto checked the staff roster and made sure the doctor they were asking about was actually on duty. An orderly went upstairs to page him, and an inspector ushered the two men into the lobby and stood guard while they waited. "*Druzhba i Mir*," one of the men shouted at the inspectors standing around the command car. "Friendship and Peace. Long live the Treaty of Peking."

Prieto waited a minute for some reason and then entered the lobby and told the inspector to frisk the two men for weapons. Weinberg was asleep and most of the inspectors present had come to think of Prieto as the second-in-command. Cooperation with the CIA men assigned to watch us was one of the Ten Commandments I had given our inspectors. I didn't want the Congress to think the CIA needed more authority than it already had.

The visitors jerked pistols out of their jackets as the inspector approached them. The inspector dropped to the floor with a bullet in his chest, and Prieto threw himself behind a chair and started shooting. One of the Russians went down, but the other Russian ducked behind some furniture and filled the room with a cloud of gas.

Prieto punched the emergency siren on his gadget belt. He crawled out of the lobby with a handkerchief over his face just as four hovercars streaked across the snow toward the hospital.

The hovercars came up the hill out of a moonless night. The guards barely had time to give the alarm. Sirens rang on every inspector's belt. The men standing in front of the main entrance scattered for cover. Gas bombs exploded. Bullets raked the driveway and the porch. The cars halted and men in gas masks jumped out and charged the main entrance.

Prieto retreated into the lobby. Men plunged toward him through the gas and he fired at them and crawled under a sofa. The gas was a sleep-inducer, but somehow he managed to hammer the elevator controls with bullets while he switched on his mike and told Weinberg what was happening.

Weinberg had just gone off duty. He was lying in his underwear in one of the rooms on the second floor which Novikov had made the hospital provide the inspectors, and he was eating a peanut butter and jelly sandwich—his mother sent him the peanut butter and jelly from Vermont—and putting himself to sleep with a history of the Crimean War. The alarm jolted him out of his stupor, and he switched on his intercom unit and grabbed his pants.

Shots and confused shouts prodded him as he dressed and ran out in the hall. He heard Prieto calling him through the din in the intercom, and he picked up just enough to know the elevators were probably out of commission. Outside the hospital the inspectors posted around the main entrance were exchanging shots with the four hovercars, and the Russian guards posted at the bottom of the hill were helping them.

Weinberg organized the other three men who were off duty and started down the center stairway just as the invaders abandoned the elevators and started up. Gas and

flying bullets filled the stairwell. The hospital security guard posted at the bottom of the stairs tried to intervene, but a bullet from downstairs killed him instantly. Weinberg dragged a bed out of one of the rooms and jammed it across the stairs, and two of his men went to block the stairway at the other end of the hall.

The inspectors who had been walking guard in back of the hospital came inside through a back entrance and managed to pour bullets into the lobby from one more direction. The gas was being pulled out by the ventilating system, and the raiders seemed to be out of bombs. In the first minutes of the battle they had filled the lobby with three times the gas they needed.

The raiders backed out of the hospital and ran for their hovercars. They screamed down the hill with bullets cracking all around them as the Russian guards revved up their vehicles and sped after them.

In Washington everybody in the monitoring room was standing up. When an inspector pressed his alarm, the command car automatically relayed everything the local intercom system picked up. The monitor assigned to the hospital had flashed Moscow, and the night watch at the embassy was recording everything the monitoring room received.

I got to the monitoring room

just as the raiders were leaving. Burnham came in looking grim and listened over my shoulder while the monitor filled me in. In the background the noise at the hospital crackled in the loud speaker.

Weinberg reported while Prieto was recovering from the gas. Three inspectors had been wounded and the inspector who had been shot in the lobby was dead. "We've found two of them dead," Weinberg said. "We're examining them now to see if we can find anything on their bodies. Novikov's been doing everything he can to help us."

The Ambassador and the Chief of Inspection for the USSR had come in on the embassy screen. They looked as bad as we felt. The Chief of Inspection was wearing a bathrobe and the Ambassador had been pulled away from a full dress dinner.

"I think we can all see what the possibilities are," Burnham said. "Either the hard-liners tried to pull a coup or the government has something hidden there it wants very bad. Either way they'll tell us it was an anti-treaty faction. If it really was, then we've got two possibilities—either there's something hidden there, or they did it to make an incident and bust the treaty that way. I suggest we tell the Foreign Minister we want to question Rudnev and Grechko. If they'll talk, we won't have to bother any legitimate patients."

The Ambassador left the screen to call the Foreign Ministry. Weinberg got his men organized, and the Chief of Inspection and I sent ten more men to the hospital. Burnham sent an urgent message to the White House, and the President asked us to give Prieto his personal thanks.

Little by little the men in the monitoring room got themselves under control. The Foreign Ministry told the Ambassador they were mortified, and another phone call from the White House advised us Premier Kutzmanov had already apologized to the President via the hot line. Every attempt would be made to track the anti-treaty hoodlums down, Kutzmanov claimed. A battalion of crack Russian troops was already speeding toward the hospital.

Secret police roused Rudnev and Grechko and rushed them to the hospital in an official limousine, and Weinberg and Prieto questioned them while Novikov looked on. Grechko remained affable and unruffled, and Dr. Rudnev threw out every explanation for the raid he could think of. The whole thing was a trick to sabotage the treaty, Rudnev shouted. Someone was trying to make him and his hospital look bad. Some of his patients were very important and had enemies, and someone might be trying to make sure one of them stayed in the hospital. Why wouldn't anyone believe him?

Weinberg and Prieto made a good interrogation team. Weinberg was calm and reasonable, and Prieto went after the two Russians like an animal which had been let out of its cage. And in the background Novikov sat in an arm chair and listened without interrupting. Novikov was a very reserved man most of the time, and I had often wondered what he was thinking when I was dealing with him at Peking, but everyone who had ever worked with him had been convinced he wanted the treaty as much as anybody in the Arms Control and Disarmament Agency. He had reacted to the raid with a fury which had looked to Weinberg like it exceeded the limits of deceit by several magnitudes, and now he sat back and let Prieto go as far as he wanted. I don't like simple explanations of human behavior, but according to our file on him, Novikov had as much reason to hate war as anybody on Earth. He had lost both parents in World War II, and his eldest son had been killed in the Siberian border incident.

Nothing could shake Rudnev and Grechko, however. Prieto's bullying merely irritated them, and with all his knowledge of programmed environment therapy Weinberg couldn't trap them in a technical mistake which would indicate there was something wrong with the programmed environment wards.

"Do what you want," Rudnev said after an hour and a half. "Go upstairs and see for yourself. I've done everything I can. It's your responsibility."

The next step, logically, was to question the rest of the staff and see if their stories all matched. That would take time, however, so Weinberg decided to try a mechanical lie-detector test instead. He set up an eye-blink camera—the lie detector in which we had the most faith—and photographed Rudnev and Grechko while they looked over a floor plan of the hospital and answered questions. The results wouldn't be conclusive, but with a little luck an analysis of the photographs might give us the information we needed to decide if we should insist on an inspection.

In spite of the raid and all the other evidence we had been accumulating, we were still hesitating. We had to balance the weight of the evidence against the consequences of a mistake. It would be a terrible tragedy if we let saboteurs wreck the treaty before we had finished the first year of the experiment.

It would be just as tragic, however, if we let the Soviet Union develop a ninety-five plus virus in secret. At the White House the President was drafting a message which left us no room for retreat if the Soviet Union failed to comply. If we didn't find a satisfactory solution in a very short time, we

were going to withdraw from the treaty.

The situation wasn't hopeless. We had the eye-blink photographs, and we were exploring several other leads which might tip the scales sooner or later. It might be several days before we found a solution, however, and we had no guarantee we were going to succeed. Like it or not, I had to sit at my desk and stare at the possibility that the treaty had been an illusion instead of a victory. I wasn't sure it was something I could live with. I was getting too old to find a new hope.

Justo Prieto had been seventeen when Fidel Castro marched into Havana on January 1, 1959. His family had started out thinking Castro was the savior of their country, according to the interview he gave the CIA agents who recruited him in Guatemala, but sometime in the next eighteen months they had decided Castro had betrayed them, and they had started working in the anti-Castro underground. Prieto's brother had died in the roundup that had followed the Bay of Pigs fiasco, and his sister had spent the last twelve years of her life in a Cuban prison. And Prieto himself had escaped from Cuba two jumps ahead of Castro's police and started working for the CIA before he was twenty. The clandestine struggle for South America was probably the blood-

iest, dirtiest chapter in the entire Cold War, and Prieto had spent his entire adult life in the thick of it.

He had spent five years fighting Communist terrorists in Colombia, and after that the CIA had given him the same kind of work in half a dozen other countries. Time after time, month after month, for twenty years he had seen the people he worked with shot down and tortured by Communist agents. He had been an eye-witness when Communist infiltrators had deliberately turned a provincial revolution in Chile into a blood bath, and he had seen the bodies of hundreds of men, women and children who had been murdered by people who were supposed to be Communists. And he had never forgotten that his family had been destroyed by the followers of a man who had claimed he was a Communist, too. He had been turned down every time he had asked for an assignment in Cuba because his superiors knew he had promised he would kill the man who had betrayed his sister.

To a man like that there could only be one explanation for an arms control treaty: it was a Communist trick and the people in the United States who had engineered it were either fools or traitors. You can't argue with the lessons that kind of experience teaches. I never went to a disarm-

ment conference in the years before the treaty without remembering that the men on the other side of the negotiating table were hated by people all over the world for very good reasons. We would have been pretty stupid if we had been surprised when we started having trouble with the people in the CIA who had that kind of background.

Weinberg had taken my orders seriously, and Prieto had been under somebody's surveillance almost every minute. Weinberg was short three men, however, and the excitement and his own fatigue had put him off guard. When they left the interrogation room to have the films developed and Prieto said he was going upstairs to rest, Weinberg nodded and let him go by himself. Prieto obviously needed sleep. He had been keeping himself awake twenty hours out of every twenty-four and he was showing the strain.

It was a bad time to be lax. The hospital was still in a state of confusion. The hospital security guards were essentially orderlies trained to handle night-watchman duties and brief emergencies, and they had been standing guard for thirty-six hours because of a crisis few of them understood. On the second floor no one had replaced the guard at the center stairway who had been killed during the fight, and on the upper floors the guards were apparently standing around the corridors exchanging

rumors. Thanks to the popular sentiment in favor of the treaty, the conspirators had been afraid to tell the hospital staff the truth about Lesechko.

Prieto killed the guard at the south stairway with one shot from his silenced pistol. He shot another guard on the eighth floor, and he clubbed a guard on the tenth unconscious, but he didn't set off a general alarm until he reached a three-man barricade on the twelfth floor and shot out the lights before he opened fire on the guards. By the time Weinberg learned he was on the loose, he was in Lesechko's quarters snapping pictures with a miniaturized camera with one hand and shooting it out with Lesechko's assistants with the other.

The assistants had been standing guard, too, but they were amateurs matched against a pro, and there were only five of them. The entire setup had been crowded into three rooms—a room for Lesechko and a computer installation on the eighteenth floor, and a combination sleeping room and lab on the nineteenth—by cutting the normal number of assistants in half and getting forty hours work out of every twenty-four man-hours. Animal cages lined the walls from floor to ceiling, and the three rooms were so crowded with equipment they made a space capsule look like a good place to stretch your legs. If we had in-

spected formally, they could have destroyed the records and presented us with a setup which could have been exactly what they claimed it was—a programmed environment for a mentally ill biochemist. And afterwards they could have back tracked a few months and started again.

The fight probably didn't last very long. There was no room to maneuver in, and the work benches were the only things any of them could have hidden behind. Prieto apparently started shooting as soon as he entered the lab—either he didn't care or he decided it was an illegal facility as soon as he saw it looked like a lab—and two of the assistants went down right away. Another assistant ran downstairs and hid with Dr. Le-sechko, but the other two assistants managed to get their guns out and trade a few shots before he put them out of action, too. They had been trained in marksmanship and hand-to-hand combat, but from what we learned later, I gather none of them had ever been in a real fight before. They were no match for an experienced man driven by emotions so strong he had apparently become a ruthless fanatic.

He grabbed an empty animal cage and started stuffing it with all the files and notebooks that looked interesting to him. Alarms were hammering all over the place, but he stopped long enough to pick up

a stack at least eighteen inches high.

He ran into the hall with the cage under his arm. A psycho-gas bomb stopped the Foreign Ministry agents who were coming up the stairs, and he covered his retreat by breaking into the legitimate programmed environments and running through the rooms yelling at the top of his lungs and firing his pistol. Patients and role-players in fantastic varieties of dress and undress crowded into the hospital and ran from environment to environment. The hospital guards had to choose between a pursuit they didn't understand and the horrors of a full-fledged riot which might erupt into the rest of the hospital. The government agents pursuing Prieto suddenly found themselves shouting through locked doors at bewildered members of the hospital staff. With one crisis piled on another, and the chief administrators of the institution locked in the interrogation room, the administrative structure of the hospital collapsed.

Weinberg had already advised Washington that Prieto was on the loose. He had tried to talk to Novikov, but the Russian had waved him off. Russian agents had closed in on the command car, and our men and theirs were eyeing each other warily. The situation was escalating into an international crisis of the first magnitude. I was in the monitoring room listening

to Weinberg and talking to the White House and the Moscow Embassy. Burnham was on his way.

Weinberg looked disgusted. He didn't say it, but he obviously blamed himself. He had dropped his guard for five minutes and now he had to sit in the command car and watch the whole situation go up in flames. There wasn't a thing we could do except tell the Russians we were sorry and cross our fingers.

"I can't find a thing out," Weinberg said. "The Russians won't tell us anything, and we can't get Prieto to answer the intercom. I don't know how he expects to get out. They're moving in every man they've got except the ones they've got around us. It looks like they've got a couple of men at every exit."

"How do they look?" I asked. "Do they look hostile?"

"They look more like they're puzzled."

Burnham came in and stood beside me. "What the Hell happened?" he said.

Weinberg looked embarrassed. "He slipped through before they got re-organized," I said.

The President came in on the White House screen, and Burnham and I sat down in another booth and filled him in. He was just as upset as we were, but he decided not to cancel a television debate with Senator Moro which was supposed to take place in only three hours—nine-thirty p.m.

Washington time. It would be an ordeal, but he still didn't want the press to know something special was going on.

Inside the hospital Prieto was working his way down floor by floor. He had put on a robe and a mask he had stolen from a role-player in one of the programmed environment wards. He had shot his way into a maximum security ward and added to the chaos by setting free some of the more violent patients. Thirty minutes after he left Lesechko's lab, he was crouching on a balcony in the back of the hospital.

He probably could have gotten away if he had jumped, but for a person with his outlook that was impossible. If they had shot him while he was running down the hill, the Russians would still have known most of the results of Lesechko's experiments, and we wouldn't have known enough to develop an immunization. He wanted to wreck the treaty, but he didn't want to leave the world at the mercy of the Kremlin. He called Weinberg on the intercom instead and made a proposition.

Weinberg listened with a poker face. Prieto wanted him to break through the Russian guards and drive the car under the balcony. Once the car was parked he was supposed to get out and keep running until he was at least a hundred meters from the car—far enough that he couldn't get to the

body before the Russian guards in case he pulled a doublecross and shot Prieto. In addition, when Prieto got in the car Senator Moro or one of Senator Moro's best known aides had to be standing by on a radio and phone hookup.

Weinberg turned around in the car so it looked like he was talking to the three men sitting with him. It was a bitter moment, but he managed to keep thinking. "All right, Justo," he murmured. "We'll have the car under the balcony as soon as we get Senator Moro. I hope you live to see the results."

"Tell it to your mother," Prieto said. "Move."

Weinberg shut off the intercom mike and called Washington. "This is a field recommendation. I don't have time to explain. Have somebody from Moro's camp stand by on this hookup. Don't tell him what it's all about, but have him ready. You've got about ten minutes to do it."

I glanced at Burnham. Weinberg was tired out and he had made a bad blunder, but he was still one of my best men. "I suggest we do what he says," I said.

Burnham studied the round face in the screen. For a moment he and Weinberg stared at each other across eight thousand kilometers and twenty years of experience. We could both guess Weinberg was making a request which could mean the end of everything we had worked for.

"Can you save the treaty?" Burnham said.

"I'm going to try," Weinberg said.

"Go ahead."

Weinberg's screen blanked. Burnham stood there with a hard look on his face, and I sat down in a vacant booth and started calling Senator Moro's headquarters.

Weinberg made sure the three men in the command cars were properly armed, and then he started whispering orders. They were to stay where they were until we had somebody from Moro's team standing by. After that, if he was still talking with the Russians, they were to give him ten more minutes. If he signalled, or if the Russians attacked him, they were supposed to break out and get to Prieto.

"If you have to shoot—shoot," Weinberg said. "Do whatever you have to to help Justo get away. If the treaty goes, we've got to have whatever he's got."

The Russians watched him walk across the snow toward their command car. A Foreign Ministry agent stepped in front of him as soon as he got close enough to hear their car radio.

"I have to have a private conference with your chief," Weinberg said. "Tell him it's urgent."

The agent relayed the message and Weinberg waited while Novikov talked to the men sitting in the car with him—two secret police

and an army officer. The hospital was lit up from top to bottom, and men were running around as if the place were on fire. Two of the violent patients Prieto had set free were running loose on the lower floors.

Novikov got out of the car and stalked toward Weinberg. He gestured and the Russians standing around the car backed out of earshot.

"What do you want?" Novikov said.

Weinberg explained the situation as fast as he could. "I don't have to spell it out for you," he said. "Everybody in Washington says you worked hard to get the treaty. If we let Prieto get away from here with what he's got, the treaty is finished. If he doesn't get away with the records, on the other hand—if we let you keep whatever Lesechko has in his head—then your country will have mine at its mercy. There's only one way we can save the treaty—let us have the records, and we'll keep the violation a secret. If you'll help me get the records away from him, that's what we'll do."

Novikov looked from his men to our command car. In the Russian command car the officer and the two secret police were watching the conversation.

"How do you know it was an illegal lab?" Novikov asked. "Dr. Lesechko's program called for a mock laboratory."

"Prieto read me some of what's in the records. Even if he's wrong, the evidence is good enough that we have to assume he's right. Washington knows there may have been a lab there, and they know you may have been developing a ninety-five plus virus. I think you can imagine what will happen if they think you may start mass producing the virus soon—and we don't know enough about it to develop a cure. The arms race we just finished will look like a game of chess."

"What do you want me to do?"

"Let me get to him first. Tell your men not to interfere with me. Tell them to keep out of shooting distance. Don't interfere with our car either."

Novikov put his hands behind his back and stared at the hospital. Weinberg waited while he thought.

"Someone in my country set up that laboratory," Novikov said. "Do you think my government did it?"

"For our purposes it doesn't matter."

"Prieto will still know about it. Can't he still reveal the information later?"

"He won't have the evidence."

"Won't some people in your country take his word?"

Weinberg swallowed. He had been hoping he wouldn't have to commit himself. He had made up his mind before he left the command car, however. If Prieto ever

got in touch with anybody who worked for Senator Moro, with or without the evidence, it might be enough to swing the election.

"He's disobeying orders," Weinberg said. "If I arrest him and he tries to resist . . ."

Novikov shook his head wearily. "You're a young man. Are you sure you know what you're saying?"

Weinberg hesitated again. Only a few days before, he and Dr. Shamlian had been talking about *War and Peace* as they drove across the Russian countryside, and he had mentioned a passage which had stuck in his mind ever since he first read it. Whenever people talk about the good of humanity, Tolstoy had said, they are always getting ready to commit a crime.

"I can do what I have to do," Weinberg said. "I don't like it but it's the only choice we've got."

Novikov shook his head again. "When do you want to enter the building?"

"As soon as I talk to my men."

"Don't waste a second. I'll do my best, but I may have problems."

Weinberg returned to his car while Novikov called some of the Foreign Ministry men to him and started giving them instructions. Novikov could talk to most of his men on his intercom system, but the hospital guards had to be reached by a messenger.

Weinberg explained the situation to the inspectors in the car.

They were to start forward five minutes after he entered the hospital. If all went well, he would be on the balcony by the time they got there.

When he turned around Novikov was talking with one of the secret police. The army officer and the other police agent were climbing out of the car.

He started toward the hospital. Several Foreign Ministry agents entered ahead of him and started spreading the word. When he looked back Novikov was shaking his intercom unit and arguing with the army officer and the police agents. One of the police agents jerked the intercom out of Novikov's hand, and the army officer shouted something.

Weinberg crossed the lobby at a trot. One of the American inspectors posted there fell in beside him when he yelled an order, and they ran up the stairs with their pistols in their hands. "No one in pistol range," the Foreign Ministry agents shouted. "Let the Americans through. Stay out of pistol range."

The Russians got out of their way. Behind them two inspectors took up positions at the bottom of the stairs.

They ran down the rear corridor and stopped in front of the office which opened onto the balcony on which Prieto was hiding. There were no Russians in sight. If the car broke out on schedule, they were all right.

Weinberg took a strip of explosive out of the kit he had gotten out of the car and fastened it onto the lock. The noise would tell Prieto he was coming, but he didn't have time to fool around with a pick. From what he had seen of the argument between Novikov and the other three Russians, he could probably expect visitors at any minute.

His hand started shaking, and he stopped and got himself under control. In spite of what he had told Novikov, he wasn't ready for this. He liked Prieto—he sympathized with anybody he thought he understood—and his training had taught him just how little men are responsible for their actions. He had become a doctor because he wanted to heal and an arms control inspector because he wanted to help put an end to slaughter.

He was scared, too. He had never been shot at in his life, but Prieto was a trained fighting man who had just proved he was exceptionally competent.

A Russian appeared at the end of the corridor. The other inspector brandished his weapon and the Russian disappeared.

Weinberg pulled the detonator strip off the explosive and stepped back. The explosion hammered at the walls of the corridor. The door shook on its hinges, and he dropped to one knee and jerked it open.

He was facing an outer office.

In the light from the hallways he could see another door a few feet away. When he tried the handle, the second door was locked, too.

Voices shouted in the hall. An inspector yelled a warning from the stairs. Guns cracked.

He stuck a strip of explosive on the inner door and jerked the detonator off. Again he swung the gun around an empty office looking for a target. He could make out the door to the balcony on the other side of the room. The only window in the place was a narrow, vertical pane far to one side of the balcony; it obviously wasn't meant to be opened, and he could have fired at the balcony from it only if he had been able to lean out. Prieto had picked his rathole with the skill of a craftsman.

The inspector in the hall ran into the outer office and flopped behind a desk. Bullets ricocheted off the walls of the corridor. Hovercar turbines screamed.

Weinberg hopped into the inner office and slammed the door behind him. The inspector outside yelled at him to hurry.

He stood on one side of the balcony door and blew the lock off. Two bullets crashed through the wood from the other side. Prieto hissed something in Spanish.

His eyes fell on a swivel chair. He pulled it to him and heaved it out as he threw the door open. Prieto grunted and he stepped outside.

Prieto's gun flamed in his face. He fired and Prieto fired back. A bullet slammed into his chest. He heard Prieto gasp, and they both fired again. A bullet cracked above his head as he slid down the door frame.

The inspectors in the car yelled at him. He was going under, but he was conscious enough to realize Prieto was down and the cage with the records in it was sitting on the floor in front of him.

He slumped to his knees and picked the cage up. Before he blacked out he managed to push it over the edge of the balcony. The men in the car grabbed it and took off with two Russian hovercars hot on their tail.

The chase lasted half an hour at the most. Once Dr. Shamlian had scanned the records and transmitted the important data to Washington, we had the advantage. Novikov took command again, and the Russian medics rushed Weinberg to the operating room. Doctors flew in from both capitals to keep him alive. He ended up with a new lung and a daily shot to correct the brain damage, but he survived.

We negotiated in secret all through the presidential campaign. For weeks we examined the situation as exhaustively as we had originally examined the treaty. We were faced with the same old mystery. Did the Soviet government want the treaty or had the

men in the Kremlin planned the violation from the start? In a world where rapid technological change was the norm, could we police an arms control agreement if our opponent was determined to violate it?

The events at the hospital proved nothing. The Soviet claim that the violation had been committed by a militarist faction fitted the facts as well as the theory that the violation had been directed by the Kremlin. Even the last minute attempt to stop Weinberg was explained as a spontaneous move by three over-zealous men who thought Novikov had exceeded his authority. The three men were given prison sentences, as were Lesechko, Rudnev and Grechko, but what did that prove? Clandestine agents have often gone into danger knowing they would be richly rewarded if they succeeded and disowned and severely punished if they failed.

Even if the violation had been planned by the Soviet government, Kutzmanov and his aides could have done it to quiet down the hard-liners and the military men who were getting nervous about our political victories in Africa and South America and wanted a good weapon in reserve in case we got carried away and pushed toward their homeland. A violation, paradoxically, could be evidence that a government wanted to preserve the treaty.

The President made his decision right after Christmas. We would keep the violation a secret and stick with the treaty. We came out of the negotiations with three more unrestricted inspections per year and an increase in the number of inspectors we could post in the Soviet Union.

The official records show Prieto died by accident. Burnham asked the President to give him some kind of posthumous honor, but the President declined. He felt it would be an empty gesture, since Prieto had no living kin, and might attract attention which would endanger everything we had accomplished.

We all thought it was stupid to hate people who opposed us, however. We were working with inadequate information, and we knew it would be years or even decades before we could be sure we had made the right decisions. Justo Prieto was a brave man. He made the choices that looked right to him, and he stuck with them to the end.

Late that March Soviet inspectors entered a prison in Illinois, and discovered that the warden and a tax-exempt foundation were operating a clandestine lab and developing a new technique in psychological warfare. In the years that followed. . . .



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Three stories in this issue deal in some manner with either the arms, space, or intelligence race between the Soviet Union and the U. S. A taste of cosier domestic conflict is needed for balance, no? That it happens to be provided by this short sample of Russian science fiction is nothing more than one of those editorial coincidences which provide food for introductions.

THE CONFLICT

by Ilya Varshavsky

"H-M, IT LOOKS AS IF WE'VE BEEN crying? Why? Has anything happened?"

Martha removed her husband's hand from beneath her chin, and, her head drooping, said:

"Nothing. I simply felt blue."

"Anything to do with Eric?"

"Oh, no. He's an ideal child. A worthy product of a machine upbringing. With a nannie like her, Eric will never give his parents any trouble."

"He's asleep?"

"He's being told the usual bedtime story. I went in ten minutes ago. He was sitting in his cot, his face flushed, casting adoring glances at his beloved Cybella. Didn't even notice me at first. But when I came up to give him a kiss,

he waved me away with both little hands, as if to tell me to wait until the story ended. Of course, a mother's not an electronic machine; she can wait."

"What did Cybella do?"

"Charming, clever, level-headed Cybella was up to the mark as she always is. 'Eric,' she says, 'give your mother, with whom you have a blood bond, a good night kiss. What did I tell you about chromosome division?'"

"Why do you hate Cybella so?"

Martha's eyes filled with tears.

"I can't stand it any longer, Luff! Please understand! Always feeling that rational machine's superiority at every step! Hardly a day passes without her letting me realize my inferiority. Please do

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something, do! Why do those awful machines have to be so horribly intelligent? Can't they perform their tasks without that? Who needs that?"

"It happens of its own accord. The laws of self-organisation are responsible. We have no hand in its individual traits or, regrettably, even its genius. Want me to ask for another robot?"

"Unfortunately, that's out of the question. Eric simply dotes on her. If we could only do something to it to make it a bit stupider. Then I'd find it much easier."

"But that'd be a crime! You know that the law has made thinking robots man's equal."

"Talk to her then! She told me such a terrible thing today that I was even at a loss what to say. No, I simply can't stand this humiliation any longer!"

"Quiet, she's coming! Get yourself in hand!"

"Hullo, boss!"

"What's that, Cybella? Surely

you know the A-1 machine doesn't use that word."

"Well, you see, I thought Martha would like it. She is always only too delighted to stress the difference between the lord of creation and a man-made machine."

Martha put up a hankie to her eyes and rushed out of the room.

"Is that all?" Cybella asked.

"Yes, you may go."

Some ten minutes later Luff went into the kitchen.

"What are you doing at the moment, Cybella?"

With measured movements Cybella removed a spool of microfilm from the receptacle in her temple.

"I was studying Flemish painting. It's my day off tomorrow and I'd like to see my descendant. His teachers say he has a genius for drawing. But I'm afraid he will not get a good enough art training at the boarding school. I have to make up for that on my days off."

"What happened between you and Martha today?"

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"Nothing special. I was clearing up the table in the morning, when by pure chance I caught a glimpse of one of the pages in her thesis and happened to notice two essential errors in the formula for the nucleic acid code. It would have been stupid of me not to tell Martha about it. I simply wanted to help her."

"And then what happened?"

"She started crying and said she was a live human being, not a robot, and that to have a machine lecturing her all the time was just as repulsive to her as kissing a 'fridge'."

"You, of course, answered back?"

"Yes, I said that if she could gratify her progenitive instinct with the help of a fridge, she would probably see nothing reprehensive in kissing it."

"I see. But it wasn't very nice to mention the instinct business."

"I didn't want to hurt her. I simply wanted her to realize that it was

all so very relative."

"Please be a bit more tactful with Martha. She is so very high strung."

"Yes, boss."

Luff winced and took himself off to the bedroom.

Martha was asleep, her nose pressed into the pillow, and whimpering from time to time.

Trying not to waken her, Luff tiptoed away and lay down on the couch.

He felt terrible.

Meanwhile, in the kitchen, Cybella was thinking, not for the first time, that this constant contact with human beings was growing unbearable, that one could not demand that machines, now much cleverer than man, express everlasting gratitude to their creators. Indeed, if it were not for maternal affection for her little cyberkid, who had no one else in the whole wide world, she would willingly throw herself out of the twentieth floor window.

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"Hold everything!"

BOOKS



IN THE FIRST FOUR MONTHS OF 1967, s-f titles have been issued by American publishers at the rate of almost one a day. Of course, a number of them are reprints or "re-issues" (a paperback publisher's device for making a second printing look like a new title); but against these must be added the unofficial s-f titles (released as "suspense" or just as "novels") and the scattering of speculative non-fiction of special interest to s-f readers.

One way and another, the books do pile up, and although a shocking proportion of them are not worth mentioning, there is always a stack of titles waiting to get worked in before the space and deadline-time run out each month. And since they tend to be the "lighter" books, of which there is not much more to say than, "Good reading," a vacation-season column seems a good time to catch up on some of them.

Keith Laumer and Rosel George Brown's *EARTHBLOOD* (Doubleday, \$4.50), for instance, is a colorful, absorbing, fast-paced interplanetary adventure, written with both warmth and wit—and

the kind of "carny" background feeling hardly anyone except Bill Gresham and Fred Brown have managed.

Laumer's solo *THE MONITORS* (Berkley, 60¢) starts out to be just an unusually well-handled anti-conformity novel (logical/benevolent aliens take over; individualist hero fights back for the right to be wrong), and then turns into something rather less simple and more subtle—without ever losing its strongly sustained suspense.

In Frank Herbert's *THE EYES OF HEISENBERG* (Berkley, 50¢), the pattern-enforcers are an elite group of human immortals—but this one too escapes anti-conformity conformity (science-fiction's most overworked formula these days) through the vivid presentation of some fascinating ideas on genetic engineering.

Poul Anderson's *WORLD WITHOUT STARS* (Ace, 40¢) touches on the Big Brother/conformism theme without making use of the standard rebellion-against-stifling-regime pattern. Anderson is back in fine narrative form with the story of a small group of Earthmen space-

wrecked on a planet whose native population is divided into two divergent and hostile cultures: the Pack and the Herd; a primitive, individualistic, tribal society, and a mercantile, urbanized hive-culture. This one came alive for me in a way that too little of Anderson's recent work has done.

F&SF readers already know that Jack Vance, too, is at his sprawling imaginative best in his saga of Cugel the Clever, now complete in book form as *THE EYES OF THE OVERWORLD* (Ace, 45¢). For readers who have missed the Cugel stories here—these are the marvellous adventures of young Cugel in the world of magic and sorcery known as the Dying Earth, on a quest in the service of Iucounu, the Laughing Magician . . .

Avram Davidson's *THE ENEMY OF MY ENEMY* (Berkley, 60¢) lies somewhere between the Vance and the Anderson for both content and flavor; and while it does not quite match either one for sheer story-power, it is liberally dotted with the sort of rich, complex, detailed scene-setting at which few writers can surpass, or even equal, Davidson.

Long overdue for mention here is James H. Schmitz's *THE WITCHES OF KARRES* (Chilton, \$4.95)—perhaps because I have mixed feelings about it. The original novelet, which comprises the first section of the novel, is one of

the most warmly memorable, charming, *and* thought-provoking stories the science-fiction specialty field ever produced. The rest of the book seemed a let-down by contrast, for me. But for anyone who has not yet read any part of the book—highly recommended.

In a different category entirely is the new novel by Swedish author Peter Wahloo, *THE THIRTY-FIRST FLOOR* (Knopf, \$4.95). Written in the form of a police-hero detective novel, it is set in a near-future time in which a single monolithic publishing firm, having swallowed up all public communications media, is effectively the governing power of (presumably Sweden but effectively) Anyland. Chief Inspector Jensen's investigation of a series of bomb-threat notes addressed to the giant firm provides the framework for a look into the structure and personnel of the firm, leading eventually to the exposure of the secret of the thirty-first floor, in an almost too-convincing narrative of grim suspense and, one hopes, satire rather than prediction.

Refreshingly enough, there is also a stack of short-story collections on hand. Perhaps it is only because of the perennial reluctance of publishers to accept such collections that the few that do appear seem so consistently more interesting than the bulk of the novels

(many of them by the same authors). I think there is another factor involved, however—one very closely bound up with the economics of publishing, or at least Inside S-F publishing.

It is unhappily true that almost any author who sits down to write a full-length science-fiction novel today knows when he starts that he cannot get a magazine sale unless he aims it at one of just three magazine editors; it is also more than likely that he has a contract (or at least an option) with one of perhaps five or six book publishers long before the novel is completed. And while I know that almost every one of the small group of editors involved is searching eagerly for material *different* from what he has already published, the *author* knows that a novel represents a major investment of time and creative energy, and is almost inevitably influenced to some extent in the direction of whatever kind of book seems to have satisfied his particular editor in the past.

Short stories are not only short-term investments for the writer; they also have a much wider market. Among magazines which are fiction markets, there are hardly any that do not on occasion publish some sort of s-f. It is possible to find a magazine market somewhere for almost any viewpoint and almost any style, if the work is competent (and often if it is not). It is to be expected, then,

that the more original ideas and experimental treatments will show up most frequently in short story form.

Of course there are other factors involved: for instance, a dismaying proportion of the "new novels" are simply expanded versions of magazine novellas or novelets, not at all improved by the padding-out. But in all likelihood, the main reason for the superiority of the collections is simply that there are less of them, and to some extent at least, they are selected for quality rather than just availability.

To some extent . . .

One of the most interesting of the new collections—and one particularly illustrative of my point in contrasting novels and short stories—is *NINE BY LAUMER* (Doubleday, \$3.95). It is almost difficult to believe that the author of books like *RETIEF'S WAR*, *THE TIME BENDER*, or even *THE MONITORS*, is the same man who wrote "A Trip to the City" or "Cocoon," or even "Dinochrome"—but even more difficult to understand why he should have included in the same collection with those stories a protracted triviality like "Doorstep" or the Retief-out-of-drag piece, "Placement Test," or a shabby fantasy like "The Long Remembered Thunder."

Never mind—it would be worth reading for "Trip to the City" alone. (You may remember it from *Amazing* as "It Could be Anything.")

And the remaining three stories, "Hybrid," "End as a Hero," and "The Walls," are almost as good as the first trio.

The unevenness of Damon Knight's collection, *TURNING ON* (Doubleday, \$3.95), is more understandable: the book is not so much a selection as a further volume in the collected works. Nevertheless, if there was nothing more suitable than the trivial "Maid to Measure" or the 1956 inside-joke "A Likely Story" to set next to stories like "Man in the Jar," "Mary," and "Night of Lies" (still not Knight at his best—but still better than most of what you'll find elsewhere), perhaps he should have waited to publish another collection.

Fred Saberhagen's *BERSERKER* (Ballantine, 60¢) (*not* a novel, whatever Ballantine Books may say) is predictably uneven for a different reason. These are stories written as a "series," on varying themes, in varying moods, over several years' time. Of the eleven titles included, I found five excellent: "Without a Thought," "Goodlife," "Patron of the Arts," "What T and I Did," and "The Masque of the Red Shift."

Robert Silverberg's *NEEDLE IN A TIMESTACK* (Ballantine, 50¢) and John Brunner's *OUT OF MY MIND* (Ballantine, 60¢) are both much more predictable volumes. *TIMESTACK* shows little variation in story values: Silverberg is a con-

sistent craftsman in plot as well as prose. But there is a considerable, and gratifying, contrast between the earliest stories and the most recent ones (1956-1965) in philosophical depth and emotional content. For me, the most successful single entry was "To See the Invisible Man"—perhaps because it is the only one in which the author did not find it necessary to conclude on a note of—often inappropriate, almost tacked-on—cynicism.

Brunner's problem is not cynicism but conviction; the story is sometimes not strong enough for the message. Thus, although it is the intensity of Brunner's political attitudes that give life to stories like "The Totally Rich," "Fair Warning," and "See What I Mean," the same evangelism turns "Prerogative," "Single Minded," and "Eye of the Beholder" into dullish sermons. And actually, the two best stories in the book are not political, but psychological: "Such Stuff" and "The Last Lonely Man."

Perversely, I think the two volumes I found most interesting (except perhaps for the Laumer) are the two least "expert" collections—Fred Hoyle's *ELEMENT 79* (New American Library, \$4.50) and Alexander Malec's *EXTRAPOLASIS* (Doubleday, \$3.95). Perhaps it is that both books are so vigorous and so highly personal.

Hoyle has three good stories among his fifteen selections: "The Zoomen," "Agent 38," and "The Martians." The rest of the pieces are almost dramatic essays, but written with style and acid and wit. Malec, on the other hand, stumbles with his prose, frequently overwrites and is sometimes overobvious in his themes—but somehow there is a vividness, a feeling of reality, and a forcefulness of image, which convey the unique viewpoints and specialized perceptions of a man with much more to say than he has yet learned how to express. Or perhaps it is only that he has not learned to express it gracefully and with pro-

priety—and perhaps the usual proprieties are not entirely appropriate to what he has to say. Not all the stories are worth the trouble of reading, but for "Opaxtl," "10:01 a.m.," "Monsignor Primo," "Macinno," "Project Inhumane," and "Matayama," the book is well worth-while.

And finally, there is what may well prove the best reading-buy of 1967: Roger Zelazny's *FOUR FOR TOMORROW* (Ace, 45¢), with (in ascending order of preference) "The Graveyard Heart," "The Doors of his Face, The Lamps of his Mouth," "The Furies;" and the incomparable "A Rose for Ecclesiastes." —JUDITH MERRILL

BOOKS RECEIVED

FICTION

- ANALOG 5, John W. Campbell, ed.; Doubleday 1967; 242 pp.; \$4.95
 THE PAST THROUGH TOMORROW, Robert A. Heinlein; Putnam 1967; 667 pp.; \$5.95 (a collection of Heinlein's Future History stories)
 MASTERPIECES OF SCIENCE FICTION, Sam Moskowitz, ed.; World 1967; 552 pp.; \$6.50

GENERAL

- THE COMING OF THE SPACE AGE, Arthur C. Clarke, ed.; Meredith 1967; 302 pp.; \$6.95
 THE BIG SWINGERS, Robert W. Fenton; Prentice-Hall 1967; 258 pp.; \$6.95 (a biography of Edgar Rice Burroughs)
 MYSTERIOUS FIRES AND LIGHTS, Vincent H. Gaddis; McKay 1967; 280 pp.; \$5.50
 IN SEARCH OF WONDER, Damon Knight; Advent 1967; 306 pp.; \$6.00 (a collection of critical essays; Second Edition, revised and enlarged)
 ESP IN LIFE AND LAB, Louisa E. Rhine; Macmillan 1967; 275 pp.; \$5.95

L. J. T. Biese, "graduate school drop out (classical archaeology), lived on both coasts and in the middle of the U. S., presently in the Bronx, working for one of the giant aerospace corporations," here offers a lively and amusing story about a party-hopping wolfhound and his lovely young companion.

THE BARON'S DOG

by L. J. T. Biese

"THIS," I DECIDED, "IS NOT GOING to be one of my days." I'd waited in line for half an hour in the American Express office in the faint but sweet hope that some sort of kindly providence had sent me a check or a job offer, only to be crushed by the negative shrug from the bored young man behind the desk. I was so crushed, in fact, that I would have left without checking the bulletin board and missed the card completely if I hadn't caught the high heel of my sandal in a hole in the floor and leaned against the wall to catch my balance. It was inconspicuous among a dozen other notices—small and quite as elegant and neat as an engraved invitation.

"Wanted. Dog walker. Must be willing to remain in this position at least six months. Knowledge of languages helpful. Salary generous."

"Aha!" I said, a habit I had picked up from my grandfather—who had been an actor of sorts and who had raised me after my parents died. For once my handbag yielded paper and pencil at the first rummage and I noted the address, floated out the door and caught a cab in no time at all, excusing the unwonted expense with the thought that speed might possibly be of the essence. It didn't occur to me until well after the taxi had intimidated itself into Rome's midafternoon traffic that I might already be too late—that jobs with generous salaries open to foreigners were few enough and far enough between to make them sprout lines of applicants the way an old potato sprouts shootlets. I had had more than enough experience with old potatoes lately.

I was at least partly right. Even in the dim light of the large entry

hall I could see great groups of hopefuls sitting primly on antique chairs, slouching against a tapestried wall, but mostly milling around a tiny figure who had just stepped out of one of the several doorways leading off the hall. "Aha!" I muttered to myself, "and again aha!" and began to squeeze my way through the thickening crowd. After five minutes of maneuvering, I found myself farther than ever from my goal, gasping for breath with my back against one of the other doors which chose that moment to open, depositing me firmly on my backside at the foot of a carpeted stairway.

No, it was decidedly *not* one of my days. At any rate, that's what I thought until I stopped brushing myself off and looked up at the mysterious opener and shutter of doors.

This was what people meant when they said tall-dark-and-hand-some. A veritable paragon of masculine attractiveness.

"Are you hurt?" said well over six feet of paragon.

"Aha," said I, weakly.

"I beg your pardon?"

"No," I said. "Not hurt. No indeed."

"Come on," said paragon, helping me to my feet, "I'm sure you must be shaken up—and half crushed by that mob in the hall. A glass of wine won't do you any harm."

So up the stairs we went, and

along a sunny gallery and into a sort of office or study with tall windows overlooking a formal garden. Paragon thoughtfully settled me into the softest chair, poured us each a glass of wine, and then sat down behind an enormous carved desk.

"Now, if you've recovered a little, we can get down to business. Name?"

"Jane Geneth Arbuthnot: single, twenty-eight, five-foot-seven, a hundred and twenty-one pounds, sort of brownish hair, blue eyes, nationality—U.S., occupation school teacher, present employment—none. Sorry," I blushed, "but I've filled out so many job applications lately that the whole list is automatic. You *are* the one, aren't you, who wants to hire a dog walker, Mr. . . .?"

"Von Vlk. Baron Lukas von Vlk. And yes, I am in the market for a dog-walker. One with rather unusual qualifications. But then, I have a rather unusual dog. What languages do you speak?"

"English and Italian, of course; French, Spanish, and German—all fluently—with a smattering of Lithuanian and Turkish. Your dog is—ah—multilingual?"

The baron laughed. "No, but most of his admirers are. I think you'll do very well, Miss Arbuthnot, very well indeed—that is if you don't have to go back to your school teaching in . . ."

"Oh no! No. I gave up my

teaching position to come to Europe as a governess to two perfectly dreadful children from Texas. Their father started making passes, so I pushed him into the Grand Canal in Venice and he fired me. So I'm more or less stranded until I can earn passage home."

At that moment there was a knock on the door and a tiny old man looked in. "Excuse me, Baron," he said in a thick accent that sounded as much Romanian as anything. "I did not know you were still occupied. You will perhaps call me when . . ."

"Come in, Silvanus. Miss Arbuthnot, this is my trusted advisor and secretary, Silvanus." He gestured toward me. "Well, old friend, what do you think?"

The two of them stared at me in a very nervous-making way.

"Very nice," said the old man thoughtfully. "How are her other qualifications?"

"Better than we had any right to hope for. You may wish to tutor her a bit in Greek, but that is a minor detail." He turned back to me. "One more question before we decide. You are a very lovely young woman. You are not, by any chance, engaged or otherwise encumbered?"

"No. As a matter of fact I'm . . ."

"Excellent. You see, this job entails keeping rather unusual hours, and you might not wish to curtail your private life."

"I don't have any."

"Any what?"

"Private life. Or anyway, none that I wouldn't be only too happy to curtail."

"Then it is settled. Silvanus, you may tell the other applicants that the position has been filled."

When the old man had gone, the Baron refilled both our wine glasses and smiled at me. "To our profitable association," he said softly.

I would have made a charming and graceful reply except that I couldn't think of anything to say except maybe "Whoopee!"

"Now," he said, "down to business. I will see to your wardrobe myself, though you, of course, will have the final word. Silvanus and I have agreed that it would not be wise for you to live here—at least not yet—so I have taken a rather delightful little villa just outside of town. Silvanus will consult with you on its furnishings. Your basic salary will be twenty-five thousand lira a month, not including expenses . . . What's the matter?"

I must have been wearing a very peculiar expression. As a matter of fact, I was feeling pretty peculiar. "Now look, Baron," I said, "I don't know just what kind of girl you had in mind to walk your dog, but I'm getting a sneaky suspicion that I'm not it."

"But why? Perhaps if your salary were . . ."

"That's just it . . . only backwards, if you see what I mean."

"No, I can't say that I do." He gave me a puzzled and altogether attractive smile. Unfair tactics.

I hurried on. "Well let me put it this way. Just *exactly* what am I expected to do in return for this new wardrobe, 'delightful little villa' and four hundred dollars a month?"

"Take my dog to parties."

"Parties? . . . Take your *dog* to parties? Do you mind my asking why? I mean why he wants to go to parties in the first place—and why you don't take him yourself, and . . ."

"I don't at all mind your asking," said the Baron smoothly. "Unfortunately, I am unable to give you a satisfactory answer. You would do best, I think, to put it down simply to an eccentric whim."

"Oh," I said, because there didn't seem to be any other answer.

He leaned forward, his strange, pale eyes searching mine. "Let me make your duties very clear—then, when you have heard me out, you may either accept or refuse, as you wish."

"Fair enough," I said warily.

"Very well then. You will take up residence in the villa. Every afternoon you will come here, get the dog, and walk with him for two hours—it doesn't matter where. You will dine with me at least three evenings a week, and when I am invited out, you and the dog will come with me. You

will pretend two things: first, that the dog belongs to you, and second, that you and I are . . . well, shall we say, engaged. At the end of six months, we will review the situation. If at that time you wish to leave my employ or I am dissatisfied with your performance, we will let it be known that we have quarreled, that the 'engagement' is broken, and you will leave Rome—to go back to America or wherever you will. If, on the other hand, we are both pleased with the arrangement, it will continue for another six months, at which time we will again take stock, and so forth. At no time will you be called upon to do anything that is illegal, unethical, or immoral."

I still hesitated. Baron Lukas von Vlk didn't seem at all the irrational type, and it seemed that the only way I was going to find out the purpose behind his bizarre proposal was to accept it. Besides, there was no doubt whatever that I needed the money.

"All right, Baron. You have just hired yourself a fiance-cum-dog-walker. My friends call me J.G."

He looked relieved. "I shall call you Jane Geneth," he said, "and you will call me Lukas. The dog's name, by the way, is also Lukas."

"How convenient," I murmured bemusedly.

The next three days were a pauper's dream come true. At seven o'clock on the morning follow-

ing my interview with Lukas, I was awakened by a vigorous pounding on the door to my hundred-lira-a-day room in the pensione I'd been staying in since the Venice fiasco. I groaned, rolled over, and opened the door a crack without getting out of bed (it was actually more of a closet than a room).

"Ciao," I said fuzzily, "and please go away. I am very ill." It was not really a lie. Mornings—particularly the earlier parts of mornings—find me in a very fragile condition. Also, I couldn't see anything, which is not surprising, since my hair—which is long and straight and (as I think I've mentioned) sort of brown—was occluding any vision I might have managed at that hour. I tried to shut the door again, but it wouldn't.

"Good morning, Signorina," said a faintly familiar voice with a heavy Romanian accent. I brushed the lock of hair away.

"Oh. Hello, Silvanus," I said. "I thought I'd dreamed you."

His smile was only somewhat scrutable. "I have brought some men to move your belongings to the villa. Can you be ready in half an hour?"

"Um," I grunted, and the door shut again.

By the next afternoon I had been moved bag and baggage (such as it was) to a small, sunny villa outside of town. The furnish-

ings consisted almost entirely of solid, beautifully cared-for antiques, except for the kitchen and baths. I even had a staff—a cheery-faced woman of about fifty named Maria who, I was told, would have sole charge of all cooking and cleaning and things of that ilk.

I also had a new wardrobe—suits, gowns, coats, frocks, lounging outfits, underwear, shoes—that would have filled a room three times the size of the one I'd been living in. I spent half an hour reading labels and pinching myself.

Then I got down to the serious business of trying everything on. I had worked my way through to a print silk thing with spangles and no back at all, when Lukas called.

"Is everything satisfactory?"

"Satisfactory," I crooned, "oh Lukas, I haven't had so much fun since my grandfather turned me loose on his theater trunk when I was eight!"

"Excellent. I'll send a car for you in about an hour. We'll dine here tonight."

It was, of course, a perfect meal—the sort of thing you read about in the older editions of Emily Post, with liveried servants and different wines with each course. Throughout it all Lukas made polite, entertaining conversation and I grinned like an ape. I couldn't help myself. When you're that filled up with delight and excite-

ment, the excess has to leak out somewhere, and for me it means a great expanse of teeth.

Over brandy, Lukas said, "You mustn't think that we always dine this grandly, but I thought a small celebration of our engagement was in order." He reached over and took my hand. The two of us were seated close together at the head of the vast table whose white linen stretched away into dimness.

I very nearly missed my cue—and Lukas had opened his mouth to speak again, before it occurred to me that the servants weren't in on the masquerade. I lifted his hand to my cheek and gazed lovingly into his eyes. "What we have needs no celebration, Lukas." That much sounded wildly convincing. "Pomp and circumstance is only trimming—window dressing." Impressed with my own authenticity, I was about to continue, when Lukas withdrew his hand and nodded at the nearest footman, who promptly disappeared through the door to the hall. A moment later, Silvanus came in and handed his master an ornate gold box, then withdrew.

Lukas slipped the ring on my finger, his expression unreadable. I'd passed the test without knowing there was to be one. I offered a silent word of thanks to my grandfather for the subliminal acting training he'd given me.

Lukas kissed my palm and said, "Come."

I followed.

At one end of the ballroom six musicians played by candlelight. Lukas smiled. "Would you care to dance, Jane Geneth?"

I smiled too.

After half an hour or less—or more—he said, very close to my ear, "You're hired."

I looked up to answer him but didn't because he kissed me then, and as far as I know, there's no good answer to that.

Later I said, "Lukas."

"Hm?"

"I haven't met the dog."

He looked surprised, then smiled. He danced us over to the French doors that led to a balcony overlooking half of Rome and the back part of his estate. He stroked my hair (in full view of the orchestra), laughed, then led me by the hand down the curved stone staircase into the garden.

Over to one side, against a high grey wall that marked the boundary of his property, was a wire pen. Lukas made a strange noise. I looked at him, then back toward the pen. The moon was full.

"Lukas . . ."

"Yes?"

"I hate to be the first to tell you . . . Lukas that isn't a dog."

"No?"

"No. It's a wolf." I was beginning to understand why he was willing to pay so much for a dog-walker. The beast was huge, silver in the half-light of the moon.

Lukas put his arm around my shoulder. "He's a Transylvanian wolfhound. Very rare. Very valuable. They're bred to look like that, darling."

I wasn't convinced, but it was a beautiful night. I slid my arm around his waist. "At twenty-five thousand lira a month I'm pretty valuable myself."

"He'll be muzzled for your walks." Lukas's eyes were soft as he looked at me. There was a noise behind us on the balcony. He straightened. "Just one thing."

"What's that?"

"You must never allow anyone to photograph the dog. Under any circumstances. Is that understood?"

I faced him, smiling: "No photographs. No friendly tourists with Brownie Boxes, no newsmen with Rollefexes cocked. Why?"

Silvanus, close enough to make me jump, said, "Others are trying to falsify the breed. We try to make it difficult for them."

And so I began my life of deceit, enjoying every moment of it. Afternoons I walked Lukas-the-dog and evenings I spent with Lukas-the-baron. I must say that playing the Baron's devoted fiancé didn't much tax my fledgling powers as an actress; what it did strain was my imagination.

At the first grand ball we went to I was approached by a green-eyed blonde wearing solid gold

chain-mail with a sprinkling of emeralds and an expression of candied malice. "I've been dying to meet you! So you're the Baron's latest mistress."

"No," I said, practicing my purity look, "Lukas and I are engaged."

One perfectly painted eyebrow rose a fraction of an inch—not enough to crack the porcelain facade. "How . . . charming. When is the wedding to be, my dear?"

"The wedding? Oh. Well. Not for a year at least. My family has a tradition of very long engagements."

"Really? How intriguing. Just who are your people?"

Lukas arrived at that moment. "Jane Geneth, I see you've met Lady Trimbelle. Angela's one of those women who equate money with a license to be rude. Even recently acquired money. How are you, Angela?"

Angela didn't answer at once. I felt almost sorry for her. Beneath the layers of paint her face was carrying on a titanic struggle between anger and indignation on one hand, and the effort to appear charming on the other. Lukas, in case I haven't mentioned it before, is a madly attractive man. At last she said, "I'm fine, Lukas darling, and I think your fiancé is perfectly sweet. Where did you two meet?"

"The forum."

"New York?"

The green eyes glittered, so I

said quickly, "The Forum of the Twelve Caesars. It's a New York restaurant."

Later, when we were dancing, I murmured to Lukas, "We'd better get our stories straight. Who am I? I mean, who are you telling people I am?"

I felt him laugh. "You're a woman of mystery, my love. I'm not telling anyone anything, and Angela's one of the few people brash enough to ask. I'm sorry you had to face that onslaught by yourself. The woman's a menace to civilization."

"Don't apologize. Oh, Lukas, I'm having a *wonderful* time!"

"So am I," he said with an undercurrent of amusement and a bit of surprise. "So am I."

We were on our way out when I learned that Lukas was perfectly serious about not having pictures taken of Lukas-the-dog. We had brought him with us, as we always did, but why Lukas-the-baron bothered was still a mystery, since the dog spent these evenings leashed up in one of the spare bedrooms or linen closets or whatever stowage space was available in the particular mansion of the evening. Lukas-the-dog was always very well behaved. Stiff with dignity, as a matter of fact.

Anyway, the baron retrieved the dog and my wrap, and we had started down the long curve of the baroque stairway that led to the street, when we were startled by

the glare of flashbulbs. Lukas motioned me to stay back with the dog while he went down to meet the three newsmen who clustered stubbornly at the foot of the steps. He greeted them politely and answered—selectively—their deluge of questions about me and his engagement and a number of other things that were none of their business. I just stood there listening, trying to wedge myself inconspicuously behind the huge marble flower pot that capped the balustrade, and simultaneously trying to shield Lukas-the-dog with the folds of my skirt.

There was a sudden flash, much closer, and the Lukas-the-baron was standing between me and the newsmen, holding one of them off the ground by the coat collar. "I thought I had made it clear," he said with mild menace. "Miss Arbuthnot does not wish to be photographed." He did something very quick and adroit and the jittering journalist found himself astride the marble flower pot, while Lukas calmly removed the film from his camera. "Come along, darling."

The two Lukases and I marched grandly and unphotographed down the steps and into the waiting car. The baron laid the empty camera on the curb, and Silvanus drove us away.

Have you ever noticed that the world's literature is crammed with stories about women who have ab-

olutely everything going for them and who then proceed to muck up the whole works by getting curious? Pandora's Box. Cupid and Psyche. East of the Sun and West of the Moon. That sort of thing.

With me, it started out more as ambition. Sort of. I decided, one morning, that I would be a more efficient dog-walker if I knew a little more about dogs. Particularly about Transylvanian wolfhounds.

Irish wolfhounds, yes. Scottish deerhounds, yes. Bloodhounds, dachshunds, foxhounds, all yes. But nowhere even a passing reference to the possibility that there might be such a breed as the Transylvanian wolfhound. After weeks of undercover research I came to the conclusion (with a weary, "Aha") that Lukas-the-dog was a wolf.

That afternoon I took my first lunatic step into treachery. I disguised myself as an American tourist—it was Maria's day off—and took a bus into town. I went boldly into the biggest camera store I could find and bought myself one of those sub-micro-miniature things you see in spy movies, and several rolls of film.

When I got home the phone was ringing. It was Lukas. "Jane Geneth? What's the matter? You sound . . . peculiar."

"Oh nothing. A little out of breath, maybe. I was out in the garden when the phone rang."

Actually, I felt awful. And it did no good to tell myself that just because I'd bought the fiendish instrument it didn't mean I had to use it, because I knew I would use it. I've never been notably successful at rationalizing things.

Lukas had called to tell me that he wouldn't be able to go to Angela Trimbelle's party that night, but that I was expected anyway. This sort of thing had happened several times before, and usually I didn't mind too much since by now I knew—and liked—quite a number of Lukas's old friends. The number didn't include Lady Trimbelle, however. "Oh Lord! Lukas couldn't I come down with the flu or something?"

I could hear the smile behind his words, "Just this once, darling. I think I can promise you after tonight you won't have to see her again." I found out it was possible to be ecstatic and wretched at the same time: ecstatic because that's the only possible reaction to a tone of voice like that from a man like Lukas, and wretched because I knew that when (not "if"—I wasn't fooling myself) he found out about my snooping, he'd never talk to me like that again.

I dressed in black as a gesture of gloom. I was just dropping the camera into my jet-spangled evening bag when Silvanus arrived with Lukas-the-wolf and the car.

I noticed, as I had before, that when Lukas-the-baron wasn't with

us, Lukas-the-wolf acted differently. He was livelier, less dignified, and more affectionate. On this evening, he lay on the seat beside me with his head on my lap all the way to Angela's hotel. I scratched him morosely behind the ears.

Aside from Angela, there were plenty of nice people at the party. The maid took my coat, and I led Lukas-the-wolf through the suite to the bedroom that had been set aside for him. When we got there, Lukas-the-wolf wasn't having any.

"What's the matter with you, Lukas? Behave yourself!" I said firmly, then gasped and struggled to keep my balance, if not my dignity, as he towed me just as firmly back in the direction we'd come. He insisted, it seemed, upon being left in the library. "Well all right, if you're going to be like that," I said, tying his leash to the doorknob. There was a key in the lock and I had a sudden idea. "And just so you don't scare the stuffing out of some poor innocent who might wander in here, I'm going to lock you in, old boy."

For a moment, despite the leather straps of the muzzle that bound his jaws, I could have sworn that the wolf was grinning at me. Then he lay down meekly, crossed his forelegs, and shut his eyes.

I didn't hesitate for an instant. I pulled out the little camera, pointed it in his direction, and pushed the lever. The click was almost inaudible, but Lukas-the-

wolf flicked his ears back and his eyes flew open. By the time he turned his head, I'd palmed the camera and was removing the key. "See you later," I said, and locked him in.

By this time, I was feeling not only ashamed of myself, but foolish as well, wondering why it was that I'd been so nervous about letting Lukas-the-wolf catch me taking his picture. Did I think he'd tell on me? "Nuts!" I said aloud, and a waiter appeared at my elbow with a glass of champagne and a bowl of cashews.

The evening wasn't as hopeless as I'd feared. Angela unsheathed her claws once or twice, but parrying her verbal swipes was becoming second nature to me by now, and anyway, I was soon surrounded by a buffer zone of the baron's friends and well-wishers.

Maybe it was the champagne. Normally I have a sort of psychic cut-off switch for alcohol—I drink just so much and then a warning light goes on somewhere in the murky recesses of my brain, and I simply stop drinking. Champagne, however, shorts my circuits.

Around midnight I collected Lukas-the-wolf, bade Angela a saccharine farewell, and encouraged someone to pour me into my waiting car. I immediately pressed the button that lowered the glass behind the driver. "Silvanus," I said on tipsy impulse, "be a good soul

and take me to see the baron before you drive me home."

His wizened face turned profile. I thought he might be smiling—with Silvanus it's hard to tell. "It's very late. The baron may be sleeping."

"Silvanus—"

"Yes, miss?"

"Please? If he's asleep I promise to go straight home without a fuss."

The wolf beside me made a purring kind of noise.

"Very well, miss."

I smirked and stroked my grey-furred friend all the way there.

Silvanus took the wolf's leash at the door. "I'll see if the baron is up, if you care to wait in the study?"

I walked up the stairs very grandly. The curtains were drawn, and a fire was just getting started on the hearth. I paced to the windows and pulled the drape aside.

Surprise, surprise. As I watched, Silvanus appeared at the kitchen door with Lukas-the-wolf. All very well, except that there was already a Lukas-the-wolf in the pen. I let the curtain fall behind me, pulled out my camera and began snapping pictures. I had two hopes of approximately equal strength: 1) that the camera-store man had been lying about the speed of the film so the pictures proving Lukas's duplicity wouldn't turn out, and 2) that he hadn't been lying.

Silvanus and the two wolves disappeared into the small shed that served as a dog house. Or wolf house.

I cocked the camera for another shot, hesitated, then batted the curtain aside and strode through the room. I was halfway down the stairs before Silvanus materialized at their foot.

"The baron will see you presently, miss."

"No, I . . . Silvanus, take me home. I've had too much champagne and I shouldn't have come."

At the top of the stairs Lukas said, "Jane Geneth? Where are you going?"

"Home, love. Go back to bed. I'll call you in the morning."

I heard him smile. "Good night."

"Good night, Lukas." I only hoped he couldn't hear the tears.

The next morning I was up bright and early. Well early, anyway. I took the bus into town again. Lukas had offered to let me have a car for my personal use, but I'd refused. *La vita*—up until that time, at least—had been too dolce to risk it as a neophyte in Rome's traffic. I dropped the roll of film off at a place that advertised same-day service for black-and-white prints, told the man I'd pick them up that afternoon, and went back to the villa, where I spent the rest of the morning feeling wretched and packing my original belong-

ings into the battered suitcase I'd arrived with nearly three months before.

I wouldn't let Maria help me with this chore, and that normally merry soul was by turns mystified and morose. No, Lukas and I hadn't had a fight. (Not yet.) No, my grandfather was fine. I'd had a letter from him the day before. Yes, I still loved Italy.

When Silvanus arrived with the car and Lukas-the-wolf, I wasn't ready yet. I could hear Maria chattering wildly at him. Well, that was all right. By tonight everything would be finished anyway. Let them wonder for a few more hours.

Silvanus handed me into the car with his usual obscure nod. For once I was glad that he was anything but the talkative sort. I had him let us out a few blocks away from the film place and arranged to meet him there two hours later. Lukas-the-wolf and I wandered aimlessly around the streets of Rome. The weather, with calculated unpleasantness and aptness, came on to rain. I stopped at a cafe, then left again without touching the glass of wine I'd ordered and paid for.

At last the time was up. I picked up the envelope of pictures and slipped them calmly into my purse. They might have weighed a ton.

Maria was watching television commercials in the kitchen when

I got in. I waved to her and went straight to my room, locking the door behind me for the first time ever. I didn't even take off my coat, and the shaking of my hand as I took the pictures from my bag spotted the envelope with little drops of rain.

They weren't very good, but they didn't need to be. The first one showed a man sprawled on an oriental carpet. The second was very blurred, but showed two men. The third was better. Silvanus had his back to me, opening the gate to the wolf-pen, but Lukas-the-baron was neatly profiled, and the front half of Lukas-the-wolf was clearly visible off to one side.

"Aha!" I said, and burst into tears.

I mean, how would you act if you found yourself madly in love with a werewolf?

There was a light rap on the door. I shoved the damning pictures back into my purse and went to open it. Maria said, "The baron called, signorina. He said he will dine here with you tonight. I will cook something beautiful." Then she started crying too, and the two of us embraced each other and sobbed.

At last I sent her off to the kitchen so that I could bathe and dress for my last night with Lukas.

Maria outdid herself that night, but I had barely enough heart to pick at my food. Lukas seemed not

to notice. After supper we went in and sat by the fire. It was warm, and the scent of the flowers he'd brought me filled the room. Gusts of wind moaned through the pines outside and rattled the windows. Lukas sat in the tapestried arm chair, and I curled up on the fur rug at his feet, my head resting on his knees, staring into the fire.

He said, "Our places should be reversed, Jane Geneth. I should be on my knees before you."

I stared up at him. He was smiling and his eyes shone. My expression must have been somewhat comical because he laughed then, and bent to kiss me.

I turned my face away.

"Jane Geneth, I'm not going to ask you what's wrong. Because I have something very much more important to ask you. I want you . . . will you give up being my fiancé and become my wife?"

"Oh," I said in somebody else's voice. Then we had our arms around each other and were kissing and I was crying as if my heart would break. I thought it had, as a matter of fact.

He held me very close. "Will you, Jane Geneth?"

"Oh no," I wept.

He straightened then, and held me away from him. "I'm sorry. I thought . . . I thought you were . . . Well, never mind. Here. That's all right. I won't force myself on you. I'll go now."

The pain in his voice only made

me cry the harder. I shook my head and finally managed to blurt, "Please, Lukas. Wait here. Just a minute." I broke free, dashed up the stairs, grabbed the envelope and dashed back down again. He was standing looking into the fire, his shoulders slumped. "Lukas," I said between teary hiccoughs, "I'm a rat. I've . . . I've betrayed you!" I pushed the envelope at him and threw myself face down on the couch, not even crying anymore, just waiting, suspended, for the front door slamming behind him.

The sound didn't come. After an hour or two, or maybe five minutes, he came over and sat down on the edge of the couch beside me. His hand brushed at my hair. "Did you take these?" I nodded. "Have you showed them to anyone?" I shook my head. "Then you really haven't betrayed me at all."

I gathered enough courage to look up at him. He was smiling very sadly. "Oh Lukas. I do love you so desperately!"

His smile changed register. "Even knowing that I'm a . . . werewolf?"

I sat up and threw my arms around him. "I'd love you even if you were a werewart-hog. Or a werehippopotamus. Only how could you ever trust me again?"

He stood up and began feeding the pictures and negatives into the flames. "If you had agreed to marry me, I was going to tell you about myself," he said quietly. "Every-

thing. Now I'll tell you anyway. Then, if you still want to, you can go back to America or continue on as we have—a business proposition—or you can . . . consider my earlier proposal." The last negative cracked and flared, and he came and sat down again beside me.

"A werewolf, Jane Geneth, is simply a man. As far as I know, the ability to change shape, to actually become another sort of creature, is a myth. What I *can* do is make people think that I've changed my shape. It seems to be a form of mass, involuntary hypnosis. When I will it, anyone looking at me or touching me or hearing me will perceive me as a wolf."

"Oh. But a camera . . ."

"Can't be hypnotized, and a photograph can't by itself hypnotize anyone. If I'd been with you when you first looked at those prints, I could have made you see a wolf every place my likeness appeared."

I slid my hand into his. "But you weren't."

"It's a talent, like wiggling your ears, and it's also hereditary. In the old days there seem to have been a greater number of people with the gift, but particularly during the Dark Ages it became more of a liability than an asset for survival. I'm a throwback."

"But Lukas, why do you do it? I mean why the elaborate setup with a phony fiancé and like that?

When you feel the urge or whatever come over you, why not simply prowling around the house with the shades drawn?"

He laughed and kissed the palm of my hand. "There's no 'urge', even at the full of the moon. I'm in complete control, my sweet, and could go from now till doomsday without werewolfing, and it wouldn't bother me in the least. No, it's part of my job."

"Oh," I said. Then, "Your job?"

"Yes. I am not only a werewolf, Jane Geneth, I'm a spy."

"A spy . . . a secret agent?"

"Last night, when you so thoughtfully locked me up in Lady Trimbelle's study, I finally found conclusive evidence that she's been passing information to the Reds. She was picked up this morning and deported quickly back to England." He turned to face me. "Now have I proved that I trust you, my dear?"

I nodded.

"Good." He kissed me gently and stood up. "Do you think . . . Would tomorrow be too soon for you to know your answer?"

"Oh I know that now." I stood up too and slid my arms around him, fighting to get the words past the lump of happiness in my throat. "Lukas, if you don't marry me, I'll spread your story to every newspaper in town!"

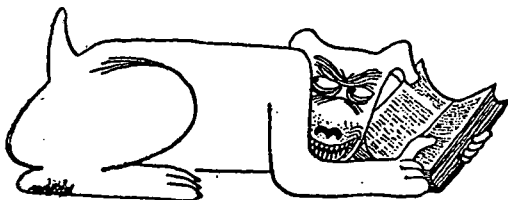
And so we were married. Our successful teamwork is something

of a legend in the unwritten annals of espionage. Now that I'm an active partner, we can plan our operations much more precisely. There've been some narrow scrapes, but they've been few . . . and anyway, Headquarters doesn't like us to take unnecessary chances.

What else? Oh yes. We're more

in love than ever, and happier than any two people have any real right to be. In fact, there's only one problem. Lukas bred true. Our twin two-year old sons spend three quarters of their waking hours being puppies.

Have you ever tried to find suitable playmates for werecubs?



SOCIAL NOTE FROM ALL OVER

You may date the new Martian next door, darling daughter,
Precious jewels his four hands adorning;
But in case he suggests a short stroll, daughter darling,
Bear in mind that four-armed is fair warning.

—JULIAN F. GROW

Dean Koontz is twenty-one years old. He writes: "it seems as if the first light I saw upon birth was the sunburst on a Finlay drawing." This ambitious and, to our mind, highly successful story concerns space exploration; but its development is in mythic, rather than scientific, terms. Our ancient poets wrote of "gods that used to share this earth." What of the gods on an alien planet in an alien star system . . . ?

SOFT COME THE DRAGONS

by Dean R. Koontz

"AND WHAT WILL YOU DO WHEN the soft breezes come and the dragons drift in to spread death?"

Marshall wriggled in his seat, reached for another sugar packet to empty into his mug of coffee.

"I'll tell you what you'll do. You'll get up when the alarms sound and dress in your uniform and go down in the cellar complex like a red-eyed mole in flight from his own fear. You'll get up when the alarms sound and monitor everything as usual, hiding until the dragons float out and are gone."

"What am I supposed to do?" Marshall asked. "Maybe I should pet them and pour out milk?"

"You wouldn't pet, you'd club. The milk would have cyanide in it."

Marshall slammed his fist into the table. "You forget, Dante, that

I am commander here and you are only third line officer."

Mario Alexander Dante snorted, picked up his folio, and walked out of the rec room. Mounting the twisting stairs, he climbed two floors, stepped out into a dark, narrow hallway, and ambled to the glass observation lounge that hung like a third story patio over the beach.

It was low tide. The sea stretched away across the horizon like poured glass, glittering like a queen's jewels or like a shattered church window. Only small waves lapped at the shore, depositing minute quantities of sand, etching out microscopic gullies in the orange beach as they dragged away a corresponding amount of other grains.

It seemed to Mare Dante that

the ocean was the same on any world. It was the womb, the all-encompassing mother where men migrated at least once in their lives—like lemmings. He had walked to the edge of it on some nights, hoping to see a face. . . .

Just above the horizon floated the twin moons; their reflections stretched long across the ocean, cresting every wavelet with a tint of golden dew.

The trouble with Marshall, Dante reflected, was that he lacked imagination. He accepted everything at face value—tempered only by what his instruments told him. Being truthful with himself, he understood that he saw the old Mario Dante in the commander, and that this was why he disliked the man. The old Mario Dante, before the car crash that took Ellen and broke her body and tossed it into the ocean, before he lay in a hospital piecing together his shattered mind for seven months, the old Mario Dante had been lacking in sensitivity, in imagination. In unlocking his mental block so that he could accept the death of Ellen, the psychiatrist removed other things in passing, and opened a whole new portion of his mind.

But still, he disliked Marshall. And he was certain that the commander's Achilles heel would be struck by an arrow from the quiver of the dragons. The dragons that came daily with the tidal winds.

The dragons of emerald and vermilion and yellow and white of virgin bridal gown and devil black and jack-of-lantern orange.

The butterfly dragons that were twenty yards wide and seventy yards long—but weighed only two or three hundred pounds. The flimsy, gossamer dragons.

The dragons of beauty.

The dragons that killed with their eyes.

He sighed, turned from the window, and sat down in one of the black leather easy chairs, snapping on the small, high-intensity reading lamp in the arm. Lighting a cigarette, he looked over his newer poems.

The first three he tossed in the wastebasket without reviewing. The fourth he read, re-read, then read aloud for full effect.

"Discovery Upon Death"

*"dear mankind:
am writing you from purgatory
to say that i
have made a discovery
that i wish you
would spread around up there.
god, now listen mankind,
god is a computer
and someone misprogrammed
him . . ."*

"Not bad," said a voice from the darkness. Abner stepped into the small circle of light around the

chair. "But don't tell me the Pioneer Poet has doubts about life?"

"Please, the name is Mare."

Pioneer Poet. It was a name *Life* had coined when his first volume had been published and had won critical acclaim. He admitted it all seemed romantic: a space force surveyor drafted for three years, writing poetry on some alien world in some alien star system. But, Pioneer Poet?

"Heard about your fight with Marshall."

"It wasn't a fight."

"It was the way I heard it. What bothers you about him, Mare?"

"He doesn't understand things."

"Neither do any of us."

"Suffice it to say he might be a mirror in which I can see myself. And the reflection isn't a nice one."

They sat in silence a moment.

"You plan to sit up all night," Abner asked.

"No, Pioneer Physician, I do not."

Abner grinned. "Dragon warnings should go up in six hours. You'll need your rest."

He folded his poems and rose, flicked off the light, and said: "Fine, but let us just look at the ocean a minute, huh?"

The snakes growing from her scalp hissed and bared fangs.

His hand burned with the dribbling of his own blood where their sharp teeth raked him.

Slowly, she turned, and the beauty was there in the face—and the horror was there.

In the eyes.

And his muscles, slowly but doubtlessly and without pause, began turning to granite.

"No!" he screamed. "I think I'm just beginning to see—"

His hair became individual strands of rock. Each cell of his face froze into eternity and became a part of something that could never die—that could only be eroded by wind and rain.

And finally his eyes, staring into hers, slipped into cataract, then to stone.

And he woke to the sound of screams in his ears.

Before opening his eyes, he could see her, pinned behind the wheel, mouth twisted in agony.

The flames licking at her face as he was tossed free, the tumbling, burning car, plunging over the cliff and away.

But when the waking dream was over, he still heard the screams. He fumbled for his bed light, and the flood of yellow fire made him squint. He looked at the clock. Five o'clock in the morning Translated Earth Time.

The dragon warning was in effect. They were not screams, but the wails of mechanical voices. "Beware and Run," they seemed to say.

Bewareandrun, bewareandrun, bewareandrun . . .

He had been sleeping in his duty suit, a uniform of shimmering purple synthe-fabric. The United Earth emblem graced his right arm: a dove sitting on a green globe. That was one symbol that always repulsed him. He pictured the dove loosening its bowels.

Stumbling across the room, he palmed open the door and stepped into the corridor, blinking away the remainders of sleep from his eyes.

Holden Twain was running down the hall, strapping his nylon belt around his waist. "I have some poetry for you to look at while we're in the shelter," he said breathlessly, coming to a halt at Dante's side.

Mario liked the kid. He was five years the poet's junior, but his innocence seemed to add to his immaturity—and charm. He had not met Hemingway's Discovery of Evil. He never understood "The Killers" when he read it. Dante made him plunge through it every few weeks, searching for that glint of understanding that would mean he saw it all.

"Fine," Mario said. "That'll help pass the hours in that dreadful hole."

They set out at a steady trot down the hall, past the large windows that peered out upon the alien landscape.

At the stairwell, Mario ushered the younger man down and waited

at the head for the others from that corridor. He was captain of the block and was to be the last into the shelter from that particular accessway.

He glanced out of the nearest window. There was sure to be wind. The spindly pine-palms were swaying erratically, some bent nearly to the snapping point in the gale. This was only the front of the tidal winds, he knew, and the soft breezes and the dragons would follow.

The dragons that looked so beautiful in pictures but which killed any man who looked directly into their eyes.

The dragons that seemed to live constantly in the air—without eating.

The dragons that killed with their eyes . . .

He had a vision of the first victims, their eyes crystallized, shrunken within the blackened sockets, the brain wilted within the skull. He shuddered.

Still, it did not seem right to hide when they came.

Though the specially designed lenses failed, though dozens of scientists died trying to prove that they wouldn't, that men's eyes could be protected from the deadly dragons, it did not seem right to hide.

Though gunnery officers could not shoot them down (because only a shot in the eye seemed to kill the beasts, and aiming at those

misty, pupilless orbs was impossible), it did not seem right to squirrel away in the earth.

The last man in the corridor pounded down the stairs. Dante swung the door shut, sealed it, then flicked the shutters that would partially protect the windows.

The shelter was filled with men. The city's compliment numbered sixty-eight. They were sixty-eight prepared to wait out another three hours of dragons and silence in the cellar.

Dante decided the entire affair got more ridiculous each time. It hardly seemed as if the planet were worth all the trouble. But then he knew it was. There were the Bakium deposits, and the planet itself was central to this galaxy. Someday, it would be built nearly as heavily as Earth. A grand population.

Certainly more than sixty-eight.

Sixty-seven.

"Sixty-seven!" The Secretary shrilled.

"Impossible!" Marshall shouted.

"Mench. Menchen isn't here."

"Who has that corridor?"

"I, sir."

"Anamaxender. Why the hell didn't you notice he was missing?"

"Sorry, sir."

"You'll be damned sorry before this is over." Marshall turned to the other faces. "Who saw him last."

"I believe just about everyone was asleep, commander," Dante said quietly. Marshall opened his mouth to speak, then thought better of it. He turned to Twain. "You know corridor F?"

"Yes, sir."

Every man was required to have a memorized floor plan of the installation buried deep in the emergency vaults of his mind. It was a ridiculous question.

"Go after Menchen. Go to his room and see if he needs help. At any cost, get him back here."

"But the dragons," someone said.

"They won't be out yet, and it will be another half hour before they gain access to the upper floors."

Twain was strapping on a radio set, fastening a blaster to his belt. He crossed to Dante and handed him a sheaf of eight papers. He smiled and was gone.

At the head of the stairs, there was a sucking of a door unsealing, then a second whine as it sealed again—behind Holden Twain.

Mare Dante had nothing to do. He could have sat and worried, but the commander had been right. Dragons would not break into the upper corridors for a while yet. Until things really started getting bad above, there was no reason to worry.

He sat down and opened the folded sheets of yellow papers.

*Hath a man not eyes?
Can he feel not pain?
Does the grass grow greener?
Is God's blood rain?*

*And so it goes,
And so it is.
Is there a soul?
And if there is,
Where is it?*

M.A. Dante was jealous. *Jealousy?* When he translated that and deducted the source, he realized that Twain's poetry had taken a change for the better. It was no longer what Dante called "tree and flower poetry." There was something of a philosophical note in those last three lines. At least, there was pessimism.

Pessimism, he strongly believed, was merely realism.

Suddenly, he was very worried about the boy—the man—upstairs.

He stood and approached Marshall. "Commander, I—"

Marshall turned, his eyes gleaming, immediately on the defensive. Between clenched teeth: "Dante. What is it now? Would you like to take over command of the operation? Would you like to —"

"Oh, shut up!" He turned up the volume on the receiver that would carry Twain's words back to them. "I am not an enemy of yours. I disagree with your methods and procedure. I do not lower myself to personal vendetta."

"Listen—"

The radio crackled, interrupting the building rage within Marshall. "Twain here. Menchen is in his room. Ill. I'm going to trundle him back."

"What about the dragons?" Marshall snapped into the mike.

"I can hear them bumping softly against the window shields, trying to get in. Like big moths. Creepy."

"None in the halls?"

"No. Starting back. Out."

The dragons that killed with their eyes. Beautiful dragons so the automatic cameras showed. But dragons that no man could look upon.

Somehow, men must be able to see, he thought. The photos— Dante's mind seemed dangling on the ravine of inspiration.

When Twain returned, he was quite relieved, forgot about Marshall, and lived the moments of good poetry the younger man had composed, commenting and discussing.

"Why do you write?"

Twain thought a moment. "To detail Truth."

"With a capital T?"

"Yes."

"There isn't such a thing. Don't interrupt. There is no such thing as Truth, no purity with a tag. It is a shade of gray somewhere between black and white. It is one thing to a slave, another to a mon-

arch, and yet another to the monk who kneels alone in cloistered walls of towering granite, fingering beads. It is for no man to delineate, and for no man to criticise another's understanding of it. Truth, old son, is relative. And more than relative, it is non-existent as a pure entity."

"But in the literature classes in college, they said we were to search for the truth. The textbooks on poetry say we should write to discover truth."

The sixty plus men muttered among themselves. Marshall followed his scopes, his dials, his unfailing measuring devices that justified the way of things to man.

"That's what they tell you, Mr. Twain. That is also what I will tell you. Write to delineate truth. Yet I warn you there is no such thing. Yet I tell you never to stop looking, never to forsake the search. Yet do I tell ye that ye shall never end the quest. Do you have guts enough to keep looking, Holden Twain?"

Twain looked at him, and silently without needing to explain, he walked off and sat in a corner, staring intently at the wall where it joined the ceiling.

The rest of the day he spent tramping in and out of Abner's clinic, checking on Menchen's progress.

The blue walls of the med room made him feel as if he were hang-

ing, dangling precariously from the center of the sky. The thin silver instruments on the table, the stark functional furniture, the university degrees on the walls, the anatomical chart above the operating table as if the surgeon followed a paint-by-number method in removing an appendix—all seemed like flotsam and jetsam swirling around in the crystal sky, remnants of mankind's achievements hurled into the stratosphere after a violent swipe of a disgusted God's powerful hand.

"What does he have?"

Abner stared at the diagnostic machine's readings. "Could be a tumor."

"Could be?"

"Could be half a dozen other things. It's hidden in the maze of tissues in his bowels. Maybe I found it. Maybe not."

"What can you do?"

"Nothing."

"He'll die?"

"We don't have the most modern hospital devised by mankind at our disposal."

"I'm not blaming you, Abe."

"I am."

"He *will* die, then?"

"Yes. And because I don't understand. I don't understand."

At night, while Dante slept, Menchen died. But the poet didn't know. No one would know until the morning. And it would disturb no one's sleep. A thousand sparrows could fall at once . . .

A thousand sparrows, a million sparrows fell from the sky, between the snowflakes. They crashed silently into the pavement. They tangled in the telephone wires—looking like notes in a staff of copper, separated by pole-bars into economical musical measures. But there was no music.

After they fell, he stood, the collar of his coat turned up to ward off the cold, and looked at their bodies, broken and bleeding. And he did not understand.

Looking up into the gray sky from whence came the snow swirling like a thousand dandelion puffs blown on by children, he searched hopefully for the source of the coldness.

Far away, tires screeching . . .

Metal shredding . . .

Ghostly screams in the night, a woman in agony . . .

Perhaps, he thought, if I could look with a mirror, I could see and know. Perhaps, seeing everything backwards, the world makes sense. Maybe, if we change our perspective . . .

"Yes," said a voice.

He turned and looked at the snakes in her head, and he could not keep his eyes from dropping to hers. And slowly, forever and for always, he turned to stone, crying: "From another perspective you might be love and not hatred."

"Yes," she said, smiling.

Waking, sweating, he knew the answer. It was just crazy enough

to work. But he could not say anything. Marshall would see his effort as an attempt to gain power. It would, of necessity, be a secret project.

He turned on the bed lamp, forced himself totally awake, and set to dismantling his dressing mirror.

He was the last down the stairway at the dragon warning.

"Did you hear?" Twain asked.

"Hear what?"

"Menchen died during the night."

"Now there might be your only truth. Death."

"What?"

"It is indisputable, inevitable, and impossible of misinterpretation."

He walked away from Twain and secreted himself in a corner, hoping to blend into oblivion. It was a corner near a stairwell. Roll was called, and all were found to be present. An hour into the warning, he rose, meandered through a clot of men to the edge of the stairs. Suddenly, like a tired apparition, he was gone.

At the head of the stairs, he unsealed the door, stepped into the corridor, closed the portal behind. Carefully, he removed the delicate, makeshift spectacles from his pocket. They were diamond-like, circus-prop spectacles of glittering looking glass and golden wire. They worked roughly like a peri-

scope so that the wearer saw a mirror reflection of what was in front of him.

Sucking in his breath, he swung open the outside door and stepped onto the black soil.

The humming of giant wings sung above him.

Slowly, he turned his head to the skies.

The far-darting beams of the spirit, the un'loos'd dreams, he thought.

They were spirits and fairies above him. They were orange and magenta and coffee brown and crayon brown and pecan brown. They were white and chrome yellow and peach yellow and pear yellow.

They were thin, and in spots, through their silken wings, he glimpsed the sun. "Daedalus, your labyrinth was no more mystifying than a single wing of these creatures. And Icarus, turn from beside the sun, beauty is not up there. Look down and see."

They were dragons of the wind.

And with his lenses, their eyes did not burn him.

He walked forth, his mouth gaping. Other lines from Whitman's "Passage to India" entered his mind.

I mark from on deck the strange landscape, the pure sky, the level sand in the distance . . .

Truly, there was something about the alien landscape that seemed fresh. In the sunlight fil-

tered through gossamer wings, he seemed to see more detail. The strange way the chlorophyll was formed as a crystalline substance within the yellow-green leaves; the patterns in the sand that he had once considered only chance happenings. He looked around. There were patterns to everything. The sky was delicately shaded in a soft-hued, artistic effect. There was a tasteful blending of all nature—something he had never seen before.

He could almost see the rays of sun like individual golden rivers, beaming into everything, showering back when reflected, soaking in and disappearing when refracted. The world was more real . . .

The gigantic dredging machines . . .

He saw the mining shafts and cranes, recognizing them as dredgers that sucked the scum of a planet, sent the base ores in gross tanker ships to run large, smoky factories on an over-populated Earth where some lived in poverty and some in plenty. And they were no longer just mining tools . . .

I hear the echoes reverberate through the grandest scenery in the world . . .

From the air, vibrating the molecules of his body so that he heard with his eyes and ears and mouth and nose. So that he tasted the notes, the pitched wailings of melancholy and joy. So that joy was sweet and melancholy bittersweet.

The dragons flocked above him and sang.

The music was soundless and all sound. It was the trumpets of the marching dead and the flutes of the living angels. They were strange songs.

Crossing the great desert, the alkaline plains, I behold the enchanting mirages of waters and meadows . . .

He stumbled over the sand, heedless of destination. Everything was new to him. A thousand times before had he looked at it. Never had he seen it.

The dragons sang of it, the why of it. The why.

Careening drunkenly to the mirages, he dipped his hands in cool water and there was no mirage. The meadows smelled fresh and grassy. They were real.

A spark within his mind was re-lighted; his search had ended.

Stumbling, laughing, seeing and hearing the gossamer butterfly-formed dragons, he reached the complex, went inside, and started for the shelter door.

They were all standing there looking when he came down the stairs. He threw the glasses at their feet and laughed loudly.

"He's insane," someone said.

"No!" Mare Dante shouted. "You're insane. All of you. Crackier than a box of saltines. You hide while all of life waits for you out there with the Gods."

"The dragons?"

"The dragons, the Gods. I'm not sure yet."

"Someone grab him," Marshall shouted, working his way up front.

"And you," Mare said. "You are phony to the bottom of your being. You don't even want to be captain. You're afraid of the position. But you have to prove yourself; you're impotent—"

"Shut up!" Marshall screamed, his face white.

"Impotent because once when you were eight, your aunt—"

"Shut up!"

"I can't. It's in your eyes. God, can't the rest of you see it in his eyes?"

"How did you look at the dragons?" someone asked.

"Through a mirror."

"But other men had their eyes burned out."

"Because they could not face what they saw in the liquid eyes of the dragons. They were not killed by strange, burning rays. They simply folded and lost their souls. But it's beautiful. If you have always searched for it, you will find it in their eyes."

"What the hell are you talking about?" Abe asked.

"The dragons are not constituted of matter."

Abe stepped closer. "Talk sense, Mare. For God's sake, you'll be committed."

"When Menchen died, Abe, you told me you couldn't understand.

You can understand if you will only let yourself. Your weight estimates on the dragons are incorrect. The dragons are weightless, for they are not formed of matter. The life forms on this planet are composed of what we call abstract ideas. The dragons are truth—Truth. Truth personified. Through them, you can understand *why*.”

“He’s insane.”

“And there are other life forms here we haven’t seen. The dragons were the only ones trying to contact us, to break down our shelter. There is an opposite life form living in the ground. We thought those desert holes were caves, but they are not. There are worms that

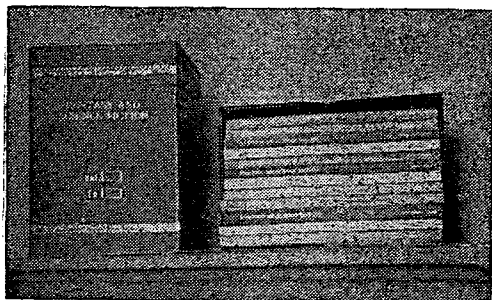
burrow miles beneath us and fester. The worms are Hate. Hate personified.”

Someone reached forward to grab him. He struggled and fell.

Miles below the sands, a long, caterpillar thing glowed momentarily and turned over.

The floor shook. Almost gleefully, the mob descended and covered Mario Dante until black swallowed and consumed him as he muttered lastly—“Ellen.”

Upstairs, the pair of discarded spectacles clamped to his head, Holden Twain stepped forward into the outside world, a blaster on his hip, determined to seek out every cave, every wormhole. . . .



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"You may give them your love but not your thoughts". is advice which most terrestrial lovers have followed, whether purposefully or not. But if one partner is not of this Earth, the recognized human channels of sense may be only a foreword to a more total—and frightening—sort of attachment.

EARTHWOMAN

by R. Bretnor

AFTER THEY HAD MADE LOVE, Will Adamson lay back in the latticed moonlight that caressed them, touching only the curve of Halley's thigh with his left hand so that they might not yet be completely separate, and he let the soft arms of the summer night possess him. Outside the open window, he heard the quiet conversation of the stream with its sand and stones, the shrill song of frogs, the life-sounds of small wild creatures—a gentle concert which still threw the land's pervading stillness into bold relief. It was a miracle after the noises of the city, the ever-present New York din to which he only recently had become inured, and which he still felt subconsciously eroding him.

He lay there thinking about Halley and her world, how he had met her, how they had come together. She had told him all about

herself, all the important things at least. She was not an out-of-stater, as so many were, but her part of New York State seemed ever further from the City, as she told it, than Chicago or Detroit, St. Louis, San Francisco. Her father was a country high school principal; her mother had taught too, before he'd married her. They were quite modern, open-minded in a quaint, 1930-ish sort of way. She had dreamed dreams of modelling, had found a job as typist-secretary; at least it was in advertising, a back-door. She had had an affair or two, experimentally. New York could be a lonely place, and you needed warmth and closeness, with—someone whom you *liked*. She had giggled. Her name wasn't Halley, really. It was Hazel. But Hazel hadn't been a name for modelling, or for the agency.

He thought of her. She was tall,

nearly as tall as he, and often beautiful, but she was too well rounded to be the kind of clothes-horse you found in the *Bazaar*. New York, he knew, was full of them. He thought of her very much as he might have thought of any girl back home, of girls whom he had loved, who had loved him—and pity for her flooded him, pity for her youth, her hopes, her beauty, her dreadful isolation.

Sleep touched him gently, as it would any man. It carried him a little way, washed him lightly ashore in wakefulness, picked him up again. Vividly, between sleep and waking, his own world came back to him. "I know you're American, like me," Halley had said to him, "but I just won't believe it, Will. You're a mysterious foreigner, that's what you are, from far away. Far, far away."

And he had thought, "My God, what would she say if I came out and told her? Told her to count the light-years. Told her how I have been prepared. What would she say if she could really see the color of my eyes, and know my name?" How strange it was to hear her speak of *closeness*. How . . .

He drifted into sleep, and dreamed that he was back on his own world when news of the discovery was being passed from mind to mind. Another planet peopled by real men! He had been too young, then, to realize what it meant, but he had shared in the

surprise, the jubilation. Now, in his dream, all that was overlaid by disappointment, which really hadn't come until much later, after the first two expeditions had returned. Then, suddenly, as dreams will, this vanished, and he was once again a boy, in his first love affair, locked in the dual privacy of love, soaring, merging, finding a new self-completeness in that strange sacrificial offering of his new identity.

He wakened suddenly. Alone. Alone. Alone. Sweet, golden Sula was an infinity away, lost, lost in space. So were they all, his people. The hard, harsh wall impressed on him had cut them off. He was alone with his own isolated ego, his own mind, cut off completely behind that wall which guarded him against the maelstrom of horror which was this world; the shrieking fears, the gnashing, gibbering hatreds, the hideous agonies and terrors of its dumb beasts. He thought of the first probing crew, breaking orbit to plunge down almost into the slums and stockyards of Chicago, and even now he shuddered—even now, when he could walk like any Earthman through the thick of it and be aware of nothing.

The moonlight shone on Halley's silver skin, and he found his hand seeking its warmth for reassurance. Gently, she turned and kissed him. Then they lay quietly in each other's arms, and spoke in

whispers of many little things. "Sweetheart, sweetheart," she said, "you hush. I want to talk to you about myself—" And she told him about a doll named Geraldine, and about a ginger cat who purred in her ear up in her attic bedroom, and how he used to reach it by climbing up the ivy and meowing at the window to come in. Sometimes, he'd come back early on a winter morning, his fur all cold and frosty, his paws like ice, and everything inside throbbing with warmth and purr. And she told him how finally, in his age, the cat had died, and then she wept a little in his arms.

How, how can love survive, here in this world? his mind cried out. And yet—small, fragile, torn and twisted—it *did* survive. That was the wonder of it, and that was why he *had* to learn whether the faculty which his own people considered the fountainhead of love existed here. He had lost hope. He had read everything available about telepathy, the crude experiments, the pros and cons of it—and there was nothing solid, definite, nothing which could not be explained by sheer coincidence or, at the best, by vagrant flashes of haphazard intuition. Mind was cut off from mind, and man from man. There was no contact.

His mind rebelled at it.

"Will," she whispered, "do you like me? Just a little bit?"

"I like you very much, Halley."

"Better than almost anyone?"

"Better than anyone within a billion miles."

She laughed softly. "Th-that—" Her voice broke momentarily. "I guess that's good enough."

She held his face between her hands and kissed him. "It could be I'm falling for you, Will."

A week before, he would have stiffened suddenly, resisting the idea. It was impossible, of course. It could not be. How could you fall in love with someone whom you did not, could not, know? Know *really*, the way that lovers knew each other on his world. And yet—well, it was strange how close he felt to her; stranger still how much had been conveyed by words, by the illumination of a face, the touch of bodies, the sharing, however fragmentary and indirect, of passion, tenderness.

He shied from the idea that he might be involved emotionally. It was impossible. It was ridiculous. Now, before long, he would be forced to summon his reserves of strength, to breach his wall of silence, and to call down to him those who would take him back to tell about his failure. The wall was not impenetrable. The fact that he could breach it, that he could call for help which, with his people's knowledge, would plunge down from unseen orbit within minutes—that fact had been his anchor-chain, his life-line to sanity. But now—now he resented it.

What had she come to represent? A seeking. A refuge. A handy substitute for everything he cherished, for all the *real* affections, the *real* people, now an infinity away. She was, he told himself, no more than a chance reflection of his own temporary emptiness, his natural human need.

And yet—

Yet there was more to her than that. There was the courage which kept her joyous in a world where, according to the natural laws he knew, only the callous and insensate could know joy. There was that quality within her which radiated love where love could be no more than a haphazard, stunted weed. That was the miracle. That was why he had not yet given up. He had become familiar with the phenomenon at secondhand—with all the Albert Schweitzers, Florence Nightingales, St. Francis—but here, smaller perhaps and less majestic, he found it in his arms.

"Halley . . . Halley, I'm falling for you too," he whispered, telling her the truth, realizing that he lied in the implicit promise. Realizing that, to her, it would mean home, husband, children, permanence.

She did not press him for additional assurances. Instead, she kissed him simply, softly, a curiously chaste kiss, a kiss of confirmation, a happy kiss. She sat up, letting her hair caress him.

Shame and confusion rose to overwhelm him; he fled from them. He reached for her. He drew her down to him, and let his body state its hot, involuntary truth to drown out, momentarily, the echoing lie.

Will Adamson woke again on the rim of dawn, to a night grown cool. The silence woke him, and again he realized how attuned he had become to the City's never-ceasing din. Like a traveller newly come ashore, who despite himself misses the accustomed pitching and rolling of his ship, he missed the roar to which his mind's defenses had made him deaf.

Hating it, he felt its absence as a ruse, a treachery lurking to catch him unawares, defenses down. Abruptly, automatically, he braced himself—but nothing changed; the harmless country silence persisted evenly.

He relaxed then, and his thoughts returned once more to his own world. He thought of everything his people knew—the long, slow opening of the faculty in childhood, in adolescence, its careful guidance from the time when it was nothing but a vague awareness of the emotions of a parent, a playmate, or a pet, through that most difficult of periods "the sorting out," when one had to learn how to discriminate between the multitude of minds surrounding one. He thought of how, some centuries since, they had discovered

how to hear the thoughts, strange, alien, indescribable, of beings on other planets, clusters, galaxies; how, finally, they had found that, linking minds, they too could speak across the terrible gap between the stars; how, at least partly, they had solved the mystery of death and of the dead. His heart sank as he recalled these things, for each one was a barrier between him and Halley, between her people and his own. Again, shame and regret flooded over him, for the false promise, for the facile lie, for the weakness in him which had made them necessary.

Suddenly he saw that all his observations, all his deduced conclusions about her people, about the people of this lovely, hideous, contradictory world, were not enough. He had to *know*. He had to find out *certainly*, before he left. Were they or were they not? Were they born crippled, incomplete, each damned to live his lifelong isolation? Or was there just a hint, a shred, a rudimentary spark which could be fostered, fed, developed into the flame of full humanity?

His training, his indoctrination, common sense, all told him to leave well enough alone, to present such data as he had to his world's scientists, to wait perhaps for further studies to be made, to take the final verdict philosophically.

Halley, beside him, breathing slowly and gently in her sleep, told him that he could never leave

unless he knew. He had to. He had to know.

And there was only one way to find out.

It meant that he would have to use his last resource, break his protective wall, summon the four who waited for his signal, circling Earth. It meant that he must try to enter Halley's mind. Whatever happened, it meant he could not stay. His own mind here, naked and alone, could not survive.

Whatever happened, he would lose her, as he had always known he would. *Perhaps—perhaps there'll be a glimmering. Perhaps I can return. Perhaps—* And then he recognized the emptiness, the foolishness, of that thin hope. For there was nothing there. There could not be.

And still he had to know.

He was chilled now. His skin was cold. He was afraid. Methodically, he made himself repeat the physical and mental sequence designed to break his iron conditioning, knowing that when it was accomplished the wall would not exist, that then he would have seconds only to brace himself against the onslaught of this world, to find out about Halley before all his strength was needed to keep his sanity, to stay alive.

As he had been trained to do, he summoned up in his imagination, vividly, that vast experience, profound and sacred, transcendent and ennobling, that linking of

all minds to seek the One which, to his people, was at once a Mass of praise and worship, a confession and a shricing, a Communion.

Then, like a man desperately hurling himself against a bolted door, he probed. Knowing that it would be repelled, his mind lashed out with all its energy.

There were no bolts. There was no tight-shut door. Her sleeping mind held no impediment. Unconsciously, it seized him as he plunged, threw him into a vault of darkness, whirled him down, down, down through years of time. It was a vortex lined with lunacy, with shrieked blasphemies, with acid cruelties and cancerous detestations, with capering nightmares, with hopeless yearnings—and with love, with love exultant and self-sacrificing, love seeking and possessing, blind love despairing, with love magnificent and conquering.

He was swept down, helplessly, saved only by his memory of that Communion. Then, suddenly, time stopped. All was still. There were no thought-forms wandering in this world, haunting it, raping its joy and its tranquility, committing their obscenities within its bounds. There was a breeze. The sky was clear and blue. She was seven or eight years old, dancing along the sidewalk, thinking of gingerbread and cookie-sheets and of the gingham dress that Granny'd made for Geraldine. He, the in-

truder, was part of her and of her happiness—so, when it happened, he received its full impact also.

The faculty awakened without warning. There was no slow development, no guidance, no possibility of understanding or adjustment. It opened, that was all—and, half a block away, in a wretched gutter of a room, a weak and vile old man was slowly, almost caressingly, beating a pregnant cur to death.

At once, in all its agony, in every detail, the episode became a part of Halley's mind. She halted in her tracks. She could not scream—

Halley had whimpered in her sleep. Now she awakened, twisting convulsively, throwing herself up to her knees on the bed. Even now, her scream was broken off. She crouched there, while whole minutes passed, staring at him, trying to cover herself strangely with her hands, trembling uncontrollably.

He could feel her mind wrestle the hideousness of what had happened all those years ago—then reach out desperately and wonderingly to the Communion to which his own still clung. He felt her utter terror, as cold as death itself and eons deep. He felt the coming of her comprehension, and her unquestioning emotional decision. He had no time to ask himself, *What have I done?* He had time only to understand that she and

her people possessed the faculty even more fully than did he and his, but that they could not use it. All most of them could do, in order to survive, was to become deafened to the noises of the city, noises which they heard but did not hear.

They had been doing it for generations, for millenia; those who failed to do it vanished into insanity or died. Now, as his own mind, inescapably, slid off into shock, he

felt the immense inborn strength within her, rendering her deaf again, but consciously—still terrified, still shaken to the core of her being, but with a sense of victory and of purpose.

Twelve minutes later, when his friends came down to get him, she was sitting like a buddha on the bed, cradling him, stroking his hair, smiling over him, ready for their long, long journey.



EMSH•

THE SCIENCE SPRINGBOARD

MOSQUITO

by Ted Thomas

MOSQUITO RESEARCH STILL continues on a large scale for the very good reason that we don't know nearly as much as you might think, or nearly as much as we should. Take this yellow fever mosquito, *Aedes aegypti*. In days long past, it was an African forest insect, breeding in the deep forest far away from man. It then began breeding in the midst of towns and villages. Outside of tropical Africa it lives only in close association with man. So when Walter Reed and his people found that it caused yellow fever, it was pretty easy to eradicate it near human habitation. Modern control methods make it possible to eliminate this mosquito entirely.

But another type of domestic mosquito has everybody baffled. These are the *Culex* mosquitoes, and the ones from the tropics are slightly different from the ones in the temperate zones. Not only that, but a *Culex* species from one city

will not cross-breed with a supposedly identical species from another city. One kind needs blood to develop its eggs, another must have fruit juices. You can't get any clues from their history, either. Nobody knows where they originated. On top of all this, these mosquitoes have been particularly good at developing immunity to our snappiest insecticides. It is easy to see why mosquito research has not by any means eliminated the mosquito.

If you can't lick them, join them. Instead of trying to wipe out mosquitoes, perhaps we ought to breed a few new kinds. Induce mutations by chemicals or radiation on a vast scale. Turn loose the hardy mutants whose bite has a beneficial effect on man. If we're lucky our mutant would replace the pesky ones we now have, and with every bite they'd inject a bit of antibiotic into a man. Or we could send the kids out to the swamps to play in order to get their injections of vitamins.

The only contact we've had with insects has been an indirect and violent one via rolled-up Newsweeks, so we are naturally a bit awed by Ted Thomas's plans for mosquitoes (preceding page). As for Charles Harness's speculations about the pesky little creatures . . . well, you won't believe it if we tell it.

BUGS

by Charles Harness

THE MONITORING VAN HAD been following the black limousine through the bleak Anatolian countryside for half an hour. To avoid alarming its quarry, the van was trying to stay well behind, nearly out of sight. Since dusk was passing rapidly into night, this was no problem. On the other hand, since he was unable to use his own lights, it was becoming increasingly difficult for the KGB man to follow the road, and he was relieved when the headlights of the car ahead winked out. He immediately left the wheel, picked his way through a maze of electronic equipment and micro TV screens to the rear of the van, and cranked up the infra-red periscope.

"The car has stopped," he said. "Open the cages, doctor."

"Hmph," said Dr. Skarav. "Too soon, yet."

"But the car doors are opening," said the other. "What are you waiting for?"

"No, not yet," said Dr. Skarav mildly. "Suppose I let the insects go now, and then those people decide this is not the place to talk in private. Suppose they get back in the car and leave. Then the whole thing is scrubbed. No, we will first let them get well away from the car."

"But they may be already talking."

"They would say nothing of importance so close to the car. They would assume—and correctly—that it is bugged. That is why they drove out here. They will talk seriously only when they are well out into the open field." He continued to adjust the banks of the TV multiplex.

"Ah, they have stopped walking."

I see the beam of a flashlight. Doctor—”

“I know. It is time. Just now, I have released the insects. They should reach the Americans in a few minutes. This species is very fast—they fly nearly forty kilometers per hour.”

“Good. You are using dragonflies tonight?”

“No. Ah, the dragonfly is fast and strong, and it’s used to carrying weight—seizes its prey in flight. But it refuses to fly at night. No, tonight we use moths.”

“These moths, they have good eyes?”

“Good enough. Of course, no insect eye is as efficient as the vertebral eye. It has no lens, and cannot focus. It is simply a bundle of thousands of hollow tubes, a highly expanded version of the light meter on your camera. At the bottom of each tiny tube is an optic nerve, which is active or inactive, depending on the amount of light it receives. Thus, the aggregate image received by the insect and broadcast back to us is a collection of several thousand dots, like a screen photograph in a newspaper. We have to get them up close, of course, because insect vision at best is not sharp beyond two or three feet.”

“But each moth has its own little TV screen here?” The KGB man jerked a thumb at the rows of micro-screens.

“Yes. Each of the several thousand on-off signals of the com-

pound eyes of each moth is reproduced faithfully on the individual TV screen for that particular moth. And everything is taped, so we can replay all or any part of the signals later on. Since each eye has an angle of vision of nearly 180 degrees, we get a nearly complete panoramic view, and this is realigned into a plane on the receiver for each moth.”

“Are the moths strong enough to carry the—” here he grinned coyly “—bugs?”

“Oh, that’s no longer any problem,” said Dr. Skarav. “I admit, in our early days, our TV transceivers were clumsy and heavy. The entire unit, including the battery, was almost as big as a collar button, and the only winged insects strong enough to carry them were the Atlas and Hercules moths, and these were useful only at night. The unit was tied to the thorax, and of course it was readily detected, particularly since the moth itself had a ten or twelve inch wingspread and inevitably attracted attention. Later, we truly miniaturized the unit, and finally we learned how to imbed it surgically in the chrysalis.”

“The bug is *inside* the moth?”

“Naturally. Now that we know how, it’s really quite simple. Shortly after pupation the larval tissues begin to liquefy. At this time, the microtransceivers are installed. We cut a tiny incision in the pupal shell, and in goes the unit. All very fast, painless, and sterile. The in-

sect is hardly aware of it, and metamorphosis proceeds unhindered. The final wing-bearing tissues take shape around the equipment. The optic nerves integrate readily with the electroconductive colloids of the receiver, and the transmitting section leads to aerial webs which become part of the supporting veins of the wings. When the lepidoptera emerge, the 'bug' is completely invisible."

"But you're not using the big moths anymore. Can your little moths carry all that weight?"

"Easily. Nowadays our units weigh only milligrams. The big breakthrough in weight reduction came when we eliminated the battery. We now draw our electrical power directly from the nervous system of the insect—a few micro-watts, small but sufficient. The heaviest part of the unit now is the metal colloid network necessary to parallel all the sensory synapses we need to cover—optical, audio, touch, and so on."

"How are your moths at picking up voices?"

"Fairly good," said Dr. Skarav. "For sound transmission, we are of course limited to species capable of hearing, and not only that, but of hearing a range of vibrations. The male mosquito can hear, but even if he were big enough, he would be useless, because he can detect only one frequency—that of the hum of the female's wings. So we take one of the species with 'ears' in the

abdomen or legs. Our moth has excellent tympani-type ears in his legs. Normally, he uses these to detect the squeaks of his enemy, the bat. Tonight he will use them to detect the voices of a different enemy."

"What species will they use tonight?" asked the American courier.

"Hummingbird hawkmoth," said the agent.

"That's odd. I collected lepidoptera when I was a boy. That one I got out of our tomato patch, back in Maryland. I didn't think they were found around here."

"Quite true. They are not indigenous. They *can't* use a local species. The scent would attract too many volunteer male insects from the fields. The scent of the female moth attracts males from two or three miles. Under natural conditions, a lady moth might expect several dozen male callers within a few hours. The path is rough along here. Use your torch. We'll stop over there at the clearing and wait for them."

"Why are you so sure it'll be the hawkmoth?" asked the American curiously.

"My valet is a KGB. He doesn't know that I know, of course. He put the scent of the female on my jacket this morning. We had the analysis from the lab by noon. Gas chromatography, you know. Works beautifully with nano-traces of

highly volatile materials, such as the pheromone of the female hawkmoth. Only one-millionth of a microgram is needed to attract the male, and I think they gave me at least ten times that."

"But why make the analysis? What difference does it make whether you know the species ahead of time?"

"We have to know the species ahead of time to program our debugger properly." He laughed. "Also, after going to all this trouble, we don't want our little visitors to get lost." He pulled a tiny perfume aspirator from his pocket. "A little down-wind, a little on your face and hands. A little on me. And we'll save a little for the 'package.' Meanwhile, let's set up our own monitor. I want to start our tapes the instant the first moth appears." He put the case down, unfolded the legs, and pulled up the aerial.

"Do you think they have released the moths yet?" asked the American.

"Let's take a look." The agent snapped on the little TV receiver in the monitor. The picture came on instantly. It showed a shifting wobbling view of the interior of Dr. Skarav's van. "There you are, as seen by one of their own moths. We get a grill effect because the moth is looking out from behind a wire mesh screen. The adjoining cages seem to be empty. I think old Skary has just released a couple of flights."

"And here they come!" whispered the American. "What wonderful, lovely creatures."

"They *are* fast," said the KGB man, bent admiringly over the TV screens. "Is that why you chose the hawkmoth?"

"That's one reason," said Dr. Skarav. "But the main reason is that it can hover, motionless in the air, like a hummingbird. This helps it to read the papers and get a good steady view of the objects those people will be handling and discussing. But of course, this is not the only reason we are using the hawkmoth. It *tastes* with its feet. When it alights on an object, it will radio back a message. If the object is metal, the moth can even tell us *which* metal."

"But suppose it isn't metal?" asked the other.

Dr. Skarav turned around and smiled in weary amusement. "You're not still trying to catch that diamond-making process? I tell you there is no such thing!"

"Not gem-quality," said the agent, carefully leveling the gleaming little heap with the jewel-tweezers. "Nevertheless, good-quality bort. Industrial-grade diamonds. And absolutely essential to Western technology. This stuff is used for truing the abrading tools that make our machinery. Also for wire-drawing, drilling oil wells, all kinds of things. We'd be lost with-

out it. The main source is South Africa, and you know the problems there. And now a process has been turned over to us for making bort synthetically, from graphite. It's cheap, it's simple, and you'll have to take it out of the country."

The American stared at the sparkling little heap. "Are you sure none of this is getting back to *them*?"

The agent brushed a bevy of moths from his face. He laughed shortly and pointed to the monitor. "They are receiving exactly what we want them to receive. *Their* bugs transmit only what they sense, and they sense only what *our* bugs tell them they sense. But I see you are not completely up-to-date. *They* use only the bug-within-bug system. *We* go one step farther. We use the bug-within-bug-within-bug. Which is to say, we infect their larvae with certain protozoa highly sensitive to electromagnetic radiation."

The American suppressed a whistle. "Quite a trick."

"In some ways, yes. On the other hand, many insects conventionally harbor protozoa—the malaria-bearing Sporozoa in the mosquito, sleeping sickness flagellates in the tsetse fly, typhus in the louse, and so on. Some are beneficial, like the cellulose-converting protozoa in the gut of the termite. And light-sensitive protozoa are of course well known—the red 'eye-spot' in the slipper paramecium helps it find

the light, and the same 'organ' in Stentor sends it into the shade. Light, of course, is simply electromagnetic radiation in the 3500-7000 Angstrom range. We use protozoa receptive in the microwave range. The difference is merely one of degree."

"But how did we get a transceiver into a one-celled animal?"

"It wasn't easy. Actually, our first attempts involved placing a sub-microscopic crystal of gallium arsenide directly within the protozoan body. But that didn't work, because the paramecium simply ejected it as foreign matter. Also, several minutes were required for each insertion—a delicate microsurgical procedure, and we needed millions of 'bugged' protozoa. So we finally discovered how to alter certain genes in the protozoan chromosomes to include gallium arsenide monomer units, so that the surgically inserted structure becomes a Mendelian characteristic inherited by the descendants: an artificial mutant, if you will. After we infect Skarav's insect larvae, our protozoa form a shell around the semi-conductors in the micro-electronic chips during metamorphosis."

"So we jam their broadcasts?" asked the American.

"Nothing so crude. We simply superimpose *our* broadcasts from these tapes on what their insects would normally pick up and send back to their van. That way, Skarav

gets a good transcript, but it tells him only what we want him to receive. If we started jamming, they'd stop this kind of bugging and develop some other kind that might give us some real trouble."

The American smiled wryly: "I know this is progress. But I like to remember the old days when a bug was something reliable and predictable, like a toothpick in a martini olive."

"The moths report a very high specific conductivity," said Dr. Skarav. "Several million times too high for diamond. More like gold, perhaps alloyed with a little silver or copper."

"Gold?" grunted the KGB man. "We are getting good signals from several different bugs." He pointed to the upper row of TV screens. "The American is counting something into a bag. Listen to the metallic clinks. It must be gold coins. About twenty pieces." He sounded wistful. "They pay well."

"Twenty-two stones," said the agent. He closed the little bag and handed it to the American. "Now for the process details." He pulled out a piece of paper. "You've got to memorize a few things right here and now, and then we'll burn this. It's supposed to mean something to our people back at Fort Meade." He began to read. "The prime code word is 'George.' This expands into G for graphite . . . E

for evaporate . . . O for overpressure . . ."

The courier listened intently.

"Hear that?" whispered Dr. Skarav. "Code word, 'N-P-K.' The audio signal is superb."

"Ssh!" admonished his companion. "Look at the visuals. There's a document. What is it? A process diagram! Can you make out any words?"

Dr. Skarav frowned at the upper bank of micro screens. "Ammonium nitrate . . .?"

"That's an explosive! It blew Leuna off the map shortly after World War I! Wait . . . there's something else. Kainite . . ."

"That's mineral potassium chloride."

"And there's super . . . super . . ."

"Superphosphate," said Dr. Skarav. "It's a process for making mixed fertilizers. N for nitrogen. P for phosphorus. K for kalium, or potassium."

"Then they are fools. Or perhaps we are the fools. They discovered we were following them. They did it to tease us."

Dr. Skarav demurred. "No, I don't think so. Sometimes they include a lot of useless information just to hide the real message. Wait a bit. Something in code may come along before it's over."

"I think I have it letter-perfect now," said the American.

"Then we're through. Or almost." The agent flashed one of his rare smiles. "I want to give them one more message. This one will be in plain-talk." He snapped his cupped hand over a moth on his jacket sleeve, then held it up, about a foot from his face. "Will you turn the monitor off, please?"

Dr. Skarav's great eyes glistened. "Hah! You see? Finally a coded message. Just as I said, that fertilizer business was merely camouflage."

His partner was equally pleased. "Undoubtedly you are correct, doctor. HQ will run that code through the cryptographic computers, and we'll soon know the secret. I'll get it off to Moscow tonight. How does it go, again?"

Dr. Skarav ran the tape back, then began to read slowly and carefully from the general screen integrator:

"Big bugs have little bugs
Upon their backs to bite 'em,
And little bugs have lesser bugs
And so on, ad infinitum . . ."

Coming soon

If a man is killed with a saw, would you call in a carpenter to solve the mystery? If a man is murdered by a robot, would you call in a robotics expert? Don't miss J. T. McINTOSH's **THE SAW AND THE CARPENTER**, a suspenseful novelet about murder in space—in our September issue. An unknown science fiction short by **JACK LONDON** is also featured in next month's issue, on sale August 1.

The October issue—our 18th anniversary all-star issue—will feature **J. G. BALLARD**, **AVRAM DAVIDSON**, **SAMUEL R. DELANY**, **FRITZ LEIBER**, and a never-before-published story by **RICHARD McKENNA**.

The U. S. now spends close to 4 billion dollars a year on manned space flight, an expenditure which has not aroused as much opposition as might have been expected some years ago. This is especially notable in view of the fact that when on occasion the press or the public asks, "Why?" the answer usually boils down to something like, "Because it's there." Perhaps this is as good a reason as any; if government financed space flight were abandoned, the challenge would remain—and someone would surely take it up.

THE BUBBLE

by J. W. Schutz

AT NINE-ON-THREE P.M., Pacific time, a meteor struck the nearly completed American space platform just as it was passing over the California coast. The platform with its equipment and personnel was converted instantly into an enormous fireball expanding in space as it hurtled eastward, producing a meteorite shower more intense than man had seen for centuries.

Young lovers exclaimed at the beauty of the sight, but many of those streaks of bright fire were the vaporized bodies of men. There had been fifty-two men in and about the space platform when the meteor struck.

The first TV and radio announcements on California stations called attention to "an un-

usual meteorite shower," then the phrase became, "Something has happened to the United States space platform!", and almost before the shower of luminous debris had spent itself, the national networks were blanketing the country with the news that all contact with the space station had been lost and that officials feared the worst.

Lacking current information, the broadcasts gave films of past launchings and statistics—how many billions had gone into the destroyed station, how many millions of man-hours it had cost, the names of the three men who had died in the ill-fated moon-landing attempt of 1971, the ever-increasing part played by Deane Aircraft

Corporation in all U.S. space programs.

In Lakeland, at four-fifteen a.m., a friend's excited phone call woke pretty, dark-haired Georgia Lighton, secretary to the President of Deane Aircraft. Without waiting for her employer's call, she dressed, took her car, and drove through the warm Florida night to the office. She was not surprised to find Theodor Deane already there, poring over a pile of papers.

He raised his head when she came in and greeted her.

"Morning, Georgia."

"Good morning, sir." She noted the dark shadows under his eyes. "Shall I fix you a cup of coffee?"

"Yes, thanks. Good idea. Then get me all the progress reports on the birds we have under construction. We may need to put a rocket up. We won't find any bodies, but Washington will certainly want to have a look."

While Deane sipped his coffee Georgia studied him. She had seen him in every possible mood—gayly taking huge risks and then working like a demon to bring his projects through safely, in a towering fury at some piece of stupidity, tensely concentrating on a mathematical analysis, crackling with excitement as he put his executive jet down on a field too small for it. But never before had she seen him look, as now, worried and dismayed. Although she was thirteen years younger than

his forty-eight, she longed to take his snow-white head, with its one raven's wing of black hair, on her breast.

He had converted most of a great aircraft empire to the exclusive uses of space, and he passionately wanted to see men set foot on the moon and nearby planets.

Suddenly Deane looked up.

"I knew every one of the men on that platform," he said softly. "Two of them came from Deane Aircraft."

The staff began drifting in with late "extras" or a word or two of sympathy. Deane quietly put most of them to work. By six-thirty the phone was ringing nearly continuously, and by seven the entire office was on hand. There was a radio at almost every desk, and there were knots of people around several television sets.

A strong public reaction to the disaster was setting in. By ten o'clock that first morning every one of the radio and TV commentators was more or less critical of the government space program. Typical comments: The program had been far too hasty. Not enough time had been taken to study the dangers of space before invading it on so large a scale. A space station was a "sitting duck," and it would have been far better to try to reach the moon and planets with small manned probes (despite the moon tragedy of '71). It had cost the taxpayer more than

he could afford while there was still disease, hunger and ignorance in the world!

There was an occasional remark too—with less logic than in other comments—that too much work and money had been given to Deane Aircraft and that the whole thing was Deane's fault somehow, while the American public had footed the bills.

Although Deane worked at a killing pace that first day to be ready to orbit a vehicle and was back and forth by helicopter to Cape Kennedy twice before evening, he was wrong about the thing he was most sure of—Washington did not ask at once for a go-and-see mission. Deane finally called NASA himself to see what was holding things up, and was told that no one would authorize anything without a great deal of further deliberation. After all, they said, there was no chance of saving anyone or salvaging anything after so many hours. Why not wait until the matter had been thoroughly studied on the ground before taking any more risks outside the atmosphere?

Deane then called Isador Bergenstein, an old friend in Washington, to find out what was going on.

"Washington is being stoned," Izzy told him. "People are phoning and telegraphing their Congressmen from Ty-Ty, Georgia, and Oriole, Nebraska, to tell 'em

not to spend another dime on space. There's talk of organizing a march on the White House. Some kooks have turned up with placards already. There isn't an elected official from You-Know-Who on down who'll risk a single vote until they get this thing figured."

"I see. You think there's no chance of a rescue or salvage attempt, then, Izzy?"

"Frankly, no. What's more, I'd say space is dead. Better get into some other business."

Certainly in the next few weeks the opposition to government space activity grew to huge proportions. There were those who said that efforts to invade space were against Nature, or against other things, but what it boiled down to was mostly dollars and cents. People, unthreatened for years by direct aggression, and not particularly prospering, were tired of paying the bills and getting nothing but an occasional newsreel bit.

For Deane, the clearest indicator was the price of Deane Aircraft stock on the New York Exchange. From the day of the meteor disaster the stock's price had gone down steadily. It now stood at half its former value and well below the stockholders' equity.

Deane's labor force was busy completing parts-contracts for space hardware, but there had been no demands from Cape Kennedy, and no word of any kind from

NASA. What if the government should get out of space? Deane Aircraft would be in trouble. For space, the government was their only customer. Then, on April 5th, the blow fell.

The President, in a TV appearance, told the public that an "agonizing reappraisal" had made it clear that the conquest of space was currently costing the people too much. What we needed, he said, was to recognize that the needs of national defense had already been adequately met, but that those of public health, crime prevention, education, housing, and other equally pressing programs had not. The administration had therefore decided to turn its attention to such matters and for the present to trust to the progress of pure science to provide the means for the solution to the problems of interplanetary exploration at some later time. He was therefore preparing and sending to the Congress a proposal, etc. . . .

The broadcast was hardly off the air before Deane received a call from NASA headquarters telling him that he should consider the "escape clauses" of all space-connected contracts as operative as of that moment. A team would be down to see him within the next few days to discuss cancellation settlements.

As he put the phone down, Georgia asked, "Trouble, Mr. Deane?"

"Yes, Georgia. Big trouble. I'm going to have to go to Washington to try to talk sense into some people."

Two hours later he was on his way.

And two days later he was back in Lakeland in time to meet a three-man team of government specialists in the settlement of cancelled contracts.

Deane fought to retain enough of his contracts to keep his workers busy, but the government team, although scrupulously fair and correct, was inexorable. Time and money were allowed to phase out certain parts of the work which were already "in pipeline"; specific sums were allowed to reconvert the Deane plant to the production of commercial aircraft (with Deane all but refusing to discuss this phase); and amounts were set aside for settlement, by Deane, in a similar manner, with his subcontractors.

Production personnel were still on eight-hour, five-day-per-week shifts, but the men knew that it was pipeline production and destined to run out at any moment. Some of the men talked wearily of finding other jobs when Deane Aircraft began laying off. Ted Deane worried with them and for them.

Once, passing her desk, he saw his secretary bending over the market quotations in the *Times*.

"Have any Deane Aircraft stock, Georgia?"

"Yes sir."

"Thinking of selling any?"

"Be glad to if you need any, Mr. Deane."

"Not exactly what I had in mind. But some people might suppose that, with the government getting out of the space business, Deane Aircraft stock wouldn't be worth much."

"When a stock is low, my broker says, it's time to buy, not sell. I've just bought some more, in fact. So have nearly all the girls in the steno pool."

"Hm-m. That stock'll *have* to recover now. I can't let them down, can I?"

Even with layoffs beginning to be necessary, Deane hated to consider reconversion to ordinary airframe production. He could do so and give the field stiff competition, but to give up space and become just another aircraft maker again—even if one of the best—meant a sort of failure. It also meant reduced production for years while sales were built up again; it meant layoffs, retraining programs, even strikes—things Deane Aircraft had never seriously had to consider.

He didn't want to consider them now. He would rather have another try at getting the government back into the game, even if only on a reduced scale. But the politicians wouldn't take up the gauntlet he flung before them. Once Deane went so far as to slam

his fist on the desk of a Very Important Person Indeed and shout at him. "Dammit, man, I'd like to launch a space platform myself and the hell with all of you!"

The VIPI regarded him with porcine calm. "All right," he said, "Why don't you?"

The question was a dash of cold water on Deane's temper, but refreshing, somehow, rather than chilling. Deane shook hands with his man absently and left.

In Lakeland he called a meeting of department heads. There was a crackle in the air to which they responded, wondering what surprise the chief had up his sleeve.

Deane did not disappoint them.

"Gentlemen," he said, "between us we control Deane Aircraft. I, for one, am interested in 'going for broke!' The company should be renamed Deane *Spacecraft*. I doubt if we'd know how to build a bird with wings again. Until now, though, we have been working for Big Brother. We've learned how to do the job, but it's been the government that has put up the money. Now they don't want to pay for space any more."

Deane paused. His people looked puzzled.

"Is there any law of nature," he resumed, "that says it has to be a *government* that puts up a space platform? What's to keep Deane Aircraft from doing it?"

Everyone tried to talk at once. It was Randolph Parker, senior

production chief, who gained the floor.

"I don't think there's any law of nature, Ted," he rumbled, "but there are some laws of common sense business that're pretty hard to get around. We've got a gigabuck or two, I'm told, but I don't know how long we'll keep it. It takes more money than we have to toss around to put up any kind of satellite. Supposing we could afford it, though. What's in it for the company if we just eat up our own capital to buy our own products?"

"Oh, come on, Randy," Deane said. "Comsat pays, doesn't it? There's room for competition right there. I can think of a dozen other things. So can you. Well-heeled universities with astronomy departments, for instance. TV stations, covering the whole country and half the rest of the world."

Jim Briggs, the young head of the legal division, spoke up.

"The laws of nature are not my field, but man-made laws are. I can see the boys in Washington clapping one injunction after another on us for invading their private precincts. The big bad wolf of National Security would be howling at your door in no time."

"Couldn't touch us, Jim, until we actually went up there. And I'd depend on you to keep them off our backs until then. No. I think Randy put his finger on it. Money. This'll cost a mint."

Turning to the others, Deane continued. "Unfortunately, most of us are beginning to have too much spare time. Let's use part of it to cost the thing out just to see if we could swing it. If we try it and fail, we go out with a bang instead of slowly bleeding to death. If we succeed, Deane Aircraft will be back on its feet. So will space exploration. And maybe, even, so will American confidence. Let's give it a whirl."

Although loyal to Deane, when the meeting broke up, most of the conferees had serious reservations.

Immediately after the meeting, Deane took off on a round-the-world swing to see airport managers in a score of different countries. His company ran Deane Airlines, which operated in them all. His idea was to augment the equipment of control towers so that a shoestring tracking network could go into operation at once when the company decided to go into space.

In a few places officials stiffened and brought out the old phrases about "violation of national sovereignty". When it became clear that no foreign government had anything to do with this scheme, that Deane was putting money into their airports on a gamble, that it would cost them no political concessions, and that it could not be talked around to something else they would rather have, such as new vehicles for their armies, they capitulated.

When he returned from the trip, Deane found the designs and estimates for the commercial satellite ready. The price was astronomical. By using every dollar of liquid assets, mortgaging, and borrowing heavily it might be possible to raise the price of the satellite itself, but this left nothing to launch it, man, or maintain it.

Deane took this in at a glance when Georgia spread the drawings and cost sheets before him. He looked at her and sighed. It wasn't too bad a try. The government had spent four and a half billion on the platform which the meteor had demolished. Even though Deane Aircraft now had the benefit of the costly research, testing, and redesigning that had gone into that monstrous expenditure, it had been foolish to expect that he could orbit a space station for peanuts. He stared at the drawings for a long time.

The drafting department had done a beautiful job. He put one gouache "artist's conception" on his desk and leaned over it. It showed the familiar wheel, nearly completed, as the government's platform had been. None of the parts in the drawing were cut away to show interiors, but enough surface skin was still lacking to leave a clear idea of the arrangements. Tiny space-suited figures floated in attitudes that showed no orientation due to gravity, giving the impression that the drawing

was now one way up, now another. The background showed an immensity of stars on a faintly luminous depth of blue-black. Deane at last pushed the drawing aside, laid a sheaf of photos of African grass huts upon it, and indicated the stack with a wave of his hand.

"Here, Georgia," he said, "have the space station framed, and one of these African pictures blown up to the same size as a companion piece. Opposite ends of the centuries, and both circular. They'll make a nice souvenir."

Georgia leafed through the pile.

"All taken in the same place?" she asked.

"No," he replied, "that's the odd part. Those huts were built by different tribes, speaking different languages, living in different parts of Africa, and unaware of each other's existence. That's why I photographed them. They look as though they had been built by the same man, yet the only thing the tribes had in common was hardship. Strange, isn't it?"

"I suppose it's because they're so poor that their huts are so much alike," Georgia said.

"How so?"

"Well . . . it looks as if they are all located in nearly desert country where building material must be hard to find. So, their huts are round. I don't know if they have really figured it out mathematically, but a circular wall encloses the greatest amount of space.

for the least amount of material. Isn't that so?"

"Yes, that's true."

"Of course, if, like us, they were building their huts in space, for the same reason their huts would have to be spherical, wouldn't they? And with light, porous walls like straw all 'round to keep off the sun, instead of just on top."

Suddenly Deane looked as if he were about to pounce. He was almost glaring at her.

"How's that? Go over that again, will you. No! Never mind. I've got it."

"Why, Mr. Deane! What's the matter?"

"Nothing. Nothing, Georgia, my girl. Only that you have just saved the Deane Aircraft Corporation's space platform!"

He charged into the outer office among the astounded stenos, gave instructions to the switchboard girl to call a crash meeting of all department heads, then, with his spectacular black and white hair in wild disarray, rushed back into his office.

"Throw out this junk, Georgia," he said, indicating the cost sheets and drawings. "I've had a brainstorm. I'm going to build a spherical space platform!"

"Surely, Mr. Deane, you're not going to scrap all that hard work and start over again? I thought the wheel-type station was worked out as the most practical."

"Have to scrap it. I hate to—

it's beautiful and the gang have every right to be proud of it. But it costs too much. So out it goes."

While Deane was helping his secretary to carry the piles of drawings and papers to the outer office, the first of the department chiefs, Randolph Parker, arrived. The others followed quickly, and within ten minutes they were all assembled.

The moment they were seated Deane began, without preliminaries. "First I want to thank you for your part in the preparation of the estimates on the difficulties and costs of launching our own satellite. It was a fine job, but we can't do it. The cost is too high, as I guess we knew when we started."

"The reason we can't get the cost down is because we are using conventional ideas and still thinking in terms of government contracts and very large sums of money. I have another idea, however, and I want to discuss it with you."

"With the hardware we have on hand we could launch an Echo-type balloon this week. The hardware belongs to the U.S., technically, but the government would let us have it for less than scrap value if we were willing to shorten our pipeline."

"Now I know an Echo balloon is not a space platform. The first micro-meteor would let the air out of it and leave its crew in space suits, and in trouble. To say nothing of radiation."

"But two balloons, one inside the other, with a layer of foam plastic between them *would be* a space platform! If the plastic remained semi-fluid it would stop most micro-meteors and seal the punctures of the few that got through. If the foam contained a bit of lead in solution or in suspension, it would also serve as radiation shielding.

"What's more, it would be a *self-constructing* space platform. One telecommand will inflate the outer balloon. Another would crack capsules on the inner surface of that balloon, setting off a chemical reaction to produce islands of foaming plastic. Never mind about the stuff running down the walls of the balloon. In free fall, where's down? A third telecommand would release tailor-made atmosphere from compression cylinders to fill the inner balloon which would, in filling, iron out the foam plastic to a uniform thickness between the two balloon skins.

"Echo One, launched in 1960, was 100 feet in diameter. That's well over half a million cubic feet of enclosed space. A small office, twelve by twelve with a nine-foot ceiling, contains thirteen hundred cubic feet. You could put four hundred offices in an Echo-sized bubble. A sphere twice the diameter of Echo One contains eight times as much room. We could give each of a thousand people a private bedroom, a private office, and still

have five hundred labs or workshops in it.

"I know this raises a lot of problems. Some of them have analogs in the plans for the wheel-type station. Others haven't. It's to discuss these problems and to see if we can put up the Bubble where we couldn't have put up the Wheel that I have called you in."

The moment Deane stopped speaking the men began to raise objections. Deane answered them all with the bristling, joyful enthusiasm for which he was famous.

The biggest problem was still finance. Assuming the bubble station were practical—and some felt that it was a lot to assume—could Deane Aircraft build, launch, and man the station with the resources at its command? Several hours and packs of cigarettes later, it was decided that, financially at least, the scheme was plausible. The meeting broke up with each man assigned to some phase of the work of making a paper mock-up.

While Georgia tidied the office, Deane scratched figures on his desk blotter. It was going to take a lot of corner-cutting to make a success of this gamble. Despite the enthusiasm with which he had tried to infect the meeting, Deane was worried. The time was past when he could risk his empire on an untried idea. For one thing, the empire was no longer his alone. It had grown greatly and in

doing so had brought in stockholders who looked to their dividends for their livelihood. There were thousands of workers' families who depended upon continuing jobs at Deane Aircraft. Perhaps he hadn't the right to stick stubbornly to spacecraft when the government itself was clearly abandoning them and at the same time giving him an opportunity to reconvert.

"Sir."

Deane started.

"Yes, Georgia."

"Before we leave, might I make a suggestion?"

"Lord, yes. Your last suggestion gave our space program a transfusion."

"Oh, I didn't think it was that important. But it has just occurred to me that the capsules that we've been using to put men in orbit for years—since the Gemini missions—are really orbiting airlocks."

"How do you mean?"

"Well, when they're pressurized the men can live in them without space suits. Then, when they want to go out, they pump the air into cylinders and open the doors. When they've finished their work in space, they come back in, close the doors, and fill the capsule up with air again. That's an airlock, isn't it?"

Deane nodded without interrupting her.

"So you don't really need airlocks to get into and out of the Bub-

ble, do you? You just rendezvous with it, dock your capsule to a docking ring, and when the pressure is the same on both sides of the ring, you open a hatch in it, come into the Bubble, take off your space suit, and there you are. Later, if you want to go into space from the Bubble, you just go by way of the docked capsule."

"Georgia, you've done it again! You've just cut another chunk out of the expenses of this operation. If you've got any more ideas, for Pete's sake, let's have them."

"Well, I did think of something while you were talking about the number of offices you could put in the enclosed space in a 200-foot bubble."

"Go on."

"I'm sure you don't mean to put a thousand people in the station, so you wouldn't need all those offices and ah—bedrooms. But you would need some privacy now and then, and I wondered about partitions and the shapes of rooms and that sort of thing. If there's no weight you don't need furniture—beds, chairs, and so on—and nothing has to be very strong, does it?"

"Strong enough to stand getting bumped now and then. There's still inertia, you know. But, no, once they're up there, things don't have to be very strong."

"Then offices and bedrooms and any other kind of rooms could be almost as fragile as soap bubbles and could be stuck to the surface

of the inside of the Station with tape, couldn't they? And the walls could be made of two thin layers of film—opaque, when necessary—quilted together and blown up like beach mattresses with a little hand pump, or even just by blowing in them like toy balloons. You could even make some equipment, which would otherwise be much heavier, in the same way with air-filled film sandwiches."

Deane whistled with astonishment."

"Go on, Georgia. Go on!"

Georgia gave a little laugh.

"All the rest of the interior space would be free. Anything you wanted to stay put could be anchored with lines no heavier than thread. You could anchor yourself to the wall or floor in the same way when you wanted to sleep or work at a particular piece of equipment. And for putting things away, you'd have transparent bags of film with a couple of tabs of sticky tape to anchor them where you wanted them. Most of the time you, yourself, would be floating like a bird, or like a fish in clear water. You could fly or swim as they do too, and no danger of getting stranded in midair with nothing to push against."

"That so?" Deane grinned delightedly. "How do you solve that one?"

"Why, in a gravityless place like that, a little hand-cranked centrifugal blower of light plastic,

clipped to your clothing like a brooch, with jet tubes leading to your shoulders or elbows would be enough to get around with. Little squid in the ocean get up a surprising speed that way. It might not be so efficient in air, of course, but it would do."

Georgia was on her feet looking as though at any moment she might illustrate what she meant by flying about the office.

"When I put it in words," she said, "it sounds like fairyland. Makes me wish I were a part of the crew."

"Georgia," Deane chuckled, "your fairyland is saving the firm heaven knows how much money. You make *me* feel that any minute now I'll break a long-standing rule and kiss a valuable secretary."

At this point a light feminine cough was heard just inside the office door. Lillian Deane was standing there lighting a cigarette.

"If the money saved amounted to a really good chinchilla evening wrap," Mrs. Deane drawled, "I don't suppose I should mind, although I don't think I'd care to watch."

Georgia, to her annoyance, felt the blood mount from her throat to her hair line, and hastily gathered up notebooks and the contents of an "out basket" and fled.

"What brings you down here at this hour, Lillian?" Deane said.

She settled herself in an armchair across from his desk and

fitted her cigarette in a holder before answering. Deane considered her with detachment. It would be difficult to find a more smoothly turned out woman than Lillian Deane. She was currently what the fashion pundits were calling an ice-blonde and, with her pallor and studied impassivity, it suited her almost too well. Her clothes had that simplicity of deep-flowing water that only a *couturier* of the first rank could achieve. Her limbs were long and finely drawn; her figure was a matter of flawless proportions—nothing so vulgar as curves. Deane noted that she wore with her cocktail dress a diamond bracelet which she had bought against his advice and for much too much money. She saw him eyeing it and smiled faintly.

"I've come to remind you, Ted—once more—that you also have social obligations. This evening, for example, I've given the hostess to understand that you would appear, and, as it's a cocktail, you *could* appear for at least a few of your precious minutes—no matter what other plans you and your secretary might have."

Ignoring the last phrase, Deane said, "Your hostess, if I remember correctly, is Mrs. Kithering, who talks continually about art without knowing the first thing about it. Her husband, a distinguished polo player, has given up seriously trying to squander his wife's grandfather's money as 'too overwhelm-

ingly tiring.' He will probably not be at the party either. I have that much in common with him. With most of his wife's guests I have nothing in common whatever."

"Ted, I *wish* you wouldn't attempt to be funny about my friends."

"You've missed the point entirely, Lillian. There is no humor intended. I have simply no time for people like the Kitherings, and if I were to waste my time with them—especially now, good Lord!—we might very well wind up below the minimum income necessary to be invited at all. And I'm sure you wouldn't care for that."

"You use your pronouns carelessly, dear. *You* might suffer from vanishing income, Ted, but I believe *I'm* well provided for. At least Briggs thinks so. And that brings up another point—my Deane Aircraft stock."

"What about it?"

"Jim Briggs told me the other evening that it had dropped to hardly more than a third of its value. He says that it may go so much lower that I should ask you to arrange a trust in my name paying fifty or sixty thousand a year if I want a secure old age. I detest thinking of old age, but I do like to be able to buy pretty trinkets when I want them." At this she held up the bracelet and jingled it before her husband's eyes.

Deane wondered why the head of his legal department offered

financial advice to his wife, but did not raise the question. Briggs was young and a shade too smooth, but an able man. He would hardly have gone out of his way to tell Lillian exactly how easily she might feather her nest with certain powers of attorney and certificates of joint ownership. Lillian had probably been asking questions to which Briggs saw no harm in giving answers. Still, with large amounts of money, you never knew. He'd have to have a chat with Briggs later. He shrugged.

"I hardly think you need worry about an uncomfortable old age, Lillian," he told her. "Meanwhile, as you and Briggs agree, you are pretty well provided for."

"With things I can't turn easily into cash if I want."

"I should hope not, Lil. And if you're thinking of disposing of any of your stock, I'd prefer that you don't just now, if you don't mind."

"I'll try not to," she said. "I do need some new evening things, however."

"How much?" Deane said, taking out his checkbook.

"Five will do, I think."

"Five hundred?"

"Don't be silly, darling. Thousand."

Deane wrote a check and handed it to her. It was for one thousand. She glanced at it expressionlessly and tucked it into her handbag.

"Since you're being difficult this

evening," she said, "I suppose you won't show up at the Kitherings' either?"

"At another time I might—not for love of the Kitherings, but to please you. But tonight, I'm sorry dear, I simply haven't time."

Lillian Deane gathered her furs about her shoulders, stubbed out her cigarette, and arranged her features in their usual expression of cool composure before leaving her husband's office. Deane did not miss the hard glitter in her eye that in another woman might have been relieved in noisy fury.

The following day Deane took Briggs to lunch, and while they were sipping their pre-luncheon martinis, raised the question of his wife's finances with him.

"Jim," he said, "Lillian told me yesterday that you were advising her on her holdings. She said you thought she was pretty well provided for."

"She certainly is." Briggs' expression was apparently frank, although Deane was observing him narrowly. "With the large amounts of the firm's assets in her name, plus the stock in your joint names and what she owns outright, if anything were to happen to you, she would *be* Deane Aircraft. I know you gave her these things for tax purposes—some of them at my suggestion—but, of course, they strengthen her position in an estate settlement."

"She also mentioned a settle-

ment that would give her a secure income," Deane said. "She told me this was your idea."

"Quite right, Ted. She's used to wealth, and if you were to—ah—leave us, she would be in charge of the company, but without cash for quite some time. Unless she wanted to dispose of some of her stock. Which, I don't have to point out, would be bad for the company right after losing its guiding spirit."

"Hm-m. Yes. I see."

"I'll go further, Ted," Briggs went on. "With the government getting out of space, and with your trying to launch a space platform yourself—or at least delaying re-conversion if you don't decide to do that—the wolves may begin to gather at any moment. Under the circumstances it would be a good thing for both of you to have some capital invested in some other income producer. I'll also say, considering your supposed nearly equal interests, that you should get Mrs. Deane's approval, in writing for the sake of appearances, before the company takes any financially dangerous steps."

Deane was impressed with Briggs' frankness and decided that he had been unreasonably suspicious. He turned the conversation to other matters for the remainder of the meal.

The plans and cost estimates of the bubble satellite were roughed out and ready for discussion a few days later. The group about the

conference table was the same as at the last meeting except for the addition of the chief accountant. As they settled in their places, Deane scanned their faces. Most of them were old friends and all of them—except for the accountant—were major stockholders. They'd control so much of the stock, in fact, that when they reached a decision, a subsequent directors' meeting to confirm it was hardly more than a formality. Deane wondered what their decision would be today. There wasn't the same air of pessimism as at the previous meeting, but neither was there a marked air of confidence. When the meeting was called to order it was Randolph Parker who spoke first.

"I think it can be done, Ted," he said.

Deane felt a surge of excitement.

"But," Parker went on, "a lot of the others don't."

A glance around the table showed that opinion was fairly evenly divided.

"The problem is money, Mr. Deane," the chief accountant said. "With the new configuration—a plastic bubble, that is—the company can build it. Also, by extending our borrowing on the prospects of future earnings of the Comsat type, we can launch it. We can even, by depleting our reserves past the danger point, man it. But there is absolutely no margin for error. Every launching must be perfect and every rendezvous must

succeed, or the whole project is endangered.

"But unfortunately, Mr. Deane," the accountant continued, mopping his brow with a large white handkerchief, "after having done all that, without a large injection of new capital we can thereafter neither operate it, service it, nor maintain it."

Further discussion made it plain that, regardless of the favorable or unfavorable bias of the particular speaker, these were the facts of the case. Deane tossed the ideas of Georgia Lighton and some money-savers of his own into the discussion, but they could only make possible the very minimum margin for error, not substantially change the situation. Deane rapped for attention at last.

"Friends," he said, "Mr. Clark has mentioned 'a large injection of new capital' and there is a way to obtain it. Back in the days when the company was small, 'Deane Aircraft' meant that I owned it. But since then you and others have furnished injections of new capital from time to time, and now it's no longer small. It could become larger still if we sold additional stock to the public. I, for one, think there are enough people who still believe in space to furnish that new capital—and I believe I can get them to do so. Since I can no longer make such a decision unilaterally, the question is, will you join me?"

Jim Briggs spoke up.

"It might be done, all right. But it would be a gamble, leaving us with another gamble on our hands—that of the space station itself. In addition, our 'ownership' of the firm would be diluted, and to make the sale of a large public issue attractive you'd have to offer stock below the market, and the price is already too low. I say reconvert to straight aircraft production and forget interplanetary space for down-to-earth common sense."

Randolph Parker's heavy bass voice cut through the ensuing babble.

"That common sense of yours is not so terribly sensible, Jim," he said. "Reconversion will take us at least three or four years, by which time, what with continuing costs, layoffs and all, Deane Aircraft will be a small outfit again, and that stock of yours will be just about worthless. For my part, I'd rather go broke trying something worthwhile than sitting on my hands."

The meeting at once split into two factions and it was only by vigorous gavel pounding that Deane was able to prevent a shouting match.

"Let's take a vote on it," Deane said.

"Secret ballot?" someone asked.

"If you wish."

"There's an even number of us."

"I'll abstain to avoid ties," Deane said.

"Fair enough."

The men wrote "reconversion" or "space platform" on slips of paper and passed them to the chief accountant. Deane watched in silence as the two small piles of slips grew. He found that his hands were actually trembling and pressed them against the table to keep them still. The accountant glanced at a pair of figures on the pad before him and announced, "Ten for reconversion; thirteen for the space platform!"

Deane lost no time getting the stock offer before the public. Days later he had bought TV time in all the major chains and was on the air with a well-planned program.

The program opened with Deane's head and shoulders against a midnight sky. His shock of white hair with the wide black streak commanded instant attention against such a background. He began speaking softly but firmly.

"I am Theodor Deane," he said, and the starry background faded into a photomural which began to flow slowly past while he talked. It showed huge hangars with seemingly endless assembly lines, power plants, rolling mills, wide wheat fields, forests of timber, all unobtrusively identified as parts of the Deane financial empire. Against this display of power, only Deane could have held the audience's attention.

He talked of battles and adventure, love and security, science and

power—and of money. Just as people were beginning to ask "What's the point?" he told them.

"This rolling panorama behind me is my capital. I control it all. I intend to put it all behind a venture to help men take one of their first firm steps toward the stars. I intend to build and operate a private space platform.

"I will not do this out of fear that someone will threaten my security. Neither will I do it extravagantly with the money of people whose only benefit from it is vague and incidental. I will do it by hard-headed, well-understood business principles for the purpose of making money from the sale of useful services. Those who are willing to share the risk with me will share the profits.

"Tomorrow you will see an announcement in your local paper of the sale of stock in a company to be known as Spacecraft, Incorporated. It will own outright all that Deane Aircraft represents. I and my associates will retain controlling interest. But we need your money and your confidence. Therefore the shares of Spacecraft, Incorporated, will be sold to the public at two thirds the value of Deane Aircraft stock. Shares will be sold only to individuals, and no one shall own more than ten. Lastly, sales will begin tomorrow at noon and will end seventy-two hours later. If you wish to buy a part of this venture after that time,

you may—but at a higher price. You may read more about it in your morning papers. Good night.”

The next day the papers carried a more or less standard announcement of the formation of the corporation, listing its aims, structure, initial capitalization, etc.

If the financial page announcements were routine and dry, the news coverage was anything but that. Deane was called everything—saint, sinner, genius, fool, philanthropist, trickster. Most of the papers, anticipating a crackdown by the Federal Government, were unfavorable. Deane, they said, was unbreakably bound by government contracts and by security regulations. They said he could never do it, that only governments had the kind of money required. They said that people had lost too much in space already. This, oddly enough, was what sold the stock. Before this, people told themselves, we never had a chance of getting it back, regardless of success or failure—now, perhaps, we do.

Then, as the seventy-two hours ticked away, the applications and letters began arriving, forwarded in bags and carloads from the brokerage firms which had handled the sales. Thousands, then hundreds of thousands of them. At the end of the seventy-two hours the issue was completely sold out, and the stock jumped five points on the open market.

On the morning of the fourth

day, also, a delegation of high-ranking government officials, including a three-star general from the Pentagon and a gentleman from the President's office, called on Deane.

The gentleman from the President's office was brief and to the point. Deane was forbidden to undertake any venture whatsoever in space without the permission and control of the Federal Government. To do so would be a violation of national security equivalent to treason. Injunctions would be issued at once if Deane so much as lifted a finger to put an unauthorized satellite into orbit.

“Do I understand,” Deane demanded, “that a law has just been passed to that specific effect?”

“Don't talk foolish, boy,” the general said. “We can make the existing security laws fit you like a straight-jacket. Try us and see!”

Deane was grim. “Well, now,” he said, “before you start to tailor that jacket I'm going to fill you in on a few facts. *Political* facts.”

The group before him tensed slightly.

“In the last three days,” Deane went on, “I have sold twenty-five million shares of stock to five million individuals. Five million people from every State in the Union, and every one of them of voting age. Distribution by political party: about even. I don't have to remind you gentlemen, naturally, that this is an election year, or that

a political embarrassment started now would have time to reach its juiciest proportions by November.

"Now then. If—I say *if*—anyone were foolish enough to oppose a project as popular as this has proved to be . . ." Deane brandished a folder labelled Statistical Analysis of Spacecraft Sales. ". . . I know my way around well enough both to find out who it might be and to make sure that a great many other people find out too."

Here the gentleman from the President's office leaped to his feet, his face crimson.

"Are you daring to threaten the United States Government with blackmail?" he shouted.

"I am not," Deane said, icily. "I am pointing out what I will do to anyone, elected by the people of the United States, who takes it upon himself to oppose their clearly expressed interests."

The general was about to jump to his feet also when a heretofore silent member of the group spoke up.

"Gus! Bill!" he said. "Be quiet. This is serious."

"Thank you, Mr. Riccioli," Deane said. Then, picking up a second folder, "One more item, gentlemen. This is a list of certain selected Spacecraft stock purchasers. It contains, among others, the names of almost every member of the House of Representatives and those of nearly two thirds of the Senate!"

The silence was finally broken by Mr. Riccioli, who gave a dry chuckle.

"I believe we all see your point, Mr. Deane." He stood up and came to the desk. "May I be one of the first to wish you success in your new venture?" And, turning to the others, "Shall we go, gentlemen?"

Riccioli was the last to leave the room. As he did so he paused.

"Did you put *my* name on that 'selected list' of yours?"

"It's there," Deane said. "That's what gave me the idea."

"Just a small speculation, you understand," the other said, and left.

The summons to a Congressional hearing did not arrive for several days, but when it did Deane appeared promptly and was handled courteously and firmly.

Deane was informed in the first five minutes that should the Congress find his actions or proposed actions even slightly prejudicial to the interests of the United States, prompt and vigorous steps would be taken to stop him. The remainder of the hearing was devoted to determining whether there was any danger that classified information would be compromised or "aid and/or comfort" given to an enemy of the United States. They were quite thorough about this.

Deane's response was to remind his questioners that, not having been an employee of the government, he had had access to infor-

mation only of a low classification and then only on a "need to know" basis. Upon the cancellation of his contracts, even this material had been surrendered to the government.

The committee, after a brief private session, informed Deane that, so far as the Congress was concerned, he might squander his fortune in any manner he saw fit. They added the warning that should any foreign government take exception to his activities the United States would take such action as the situation demanded, but that such action would not extend to relieving him of full responsibility.

The new firm, Spacecraft, Incorporated, went immediately into high gear. Simple though a bubble satellite might seem, there was a great deal still to be planned. Smaller bubbles on the inner wall of the outer skin, for example, would, by preventing the foam from occupying their sites, provide portholes when later filled with radiation-damping, non-freezing liquids. Parts of an eventual algae farm would be incorporated in a network of fine plastic tubing next to the outer skin. Georgia Lighton's idea of interior rooms of film-and-air sandwiches was refined to include additional raw material for later constructions, with supplies of epoxy adhesives, fine nylon cords, etc., all contained, before launching, within the inner bub-

ble. Deane wanted so many of the furnishings of the space station to be self-constructing that his staff was reminded of the compressed flowers made of water-absorbent pith sold in Oriental souvenir shops, which bloomed when dropped in water. One day Randy Parker left a packet of them, with a glass of water, on Deane's desk. Deane was amused but was also reminded to have the satellite stocked with a small initial supply of dehydrated foods.

It was decided to orbit the bubble with an Atlas-Agena type booster, which had been a standard workhorse since the days of the earliest attempts to orbit men. The decision was based, in part, on the fact that a nearly completed rocket, written off by the government, was already in stock. In addition to the satellite, the rocket was to carry a space capsule containing life-support systems sufficient to maintain one man for forty days. The life support equipment could be transferred from the capsule to the bubble with the simplest tools. The capsule was provided with considerable maneuvering ability so that a crewman could accompany the bubble aloft, see it safely installed in orbit—even assist if necessary in its unfolding and stabilization—and then, depending upon on-the-spot judgement, either return to earth or move into the bubble as its first occupant. Deane frankly envied that first occupant.

Bit by bit the satellite took form: its equipment was selected; its life-support systems refined so that as little as humanly possible would have to be supplied from "outside." Then every bit of equipment was subjected to a process of elimination that either did away with it entirely or, if this could not be done, reduced it to its simplest elements and then shaved away the elements until hardly more was left of it than an air-filled film.

Those who were to work with such equipment often complained that it would be impossibly fragile. If they said it would not support its own weight, Deane was quick to point out that in use neither the equipment nor the user would have any weight to support. Other similar objections were met with a football, which was a rather tough piece of enclosed air, or the objectors were invited to tear a silk sock in half.

By the time the schedule was established and the launching date was only days off, each step had been widely publicized, and, as the work had moved swiftly, the company's popularity was high. So, too, was the drain on the company's capital. If the launching failed or was even substantially delayed, money would run out completely. No second appeal could save the space platform with public money then; and the financial crash would bring down a hundred other industries with it and possibly even

throw the country into a depression.

For a time just such a delay threatened. After the spectacular destruction of the government-built space station, it was proving very difficult to line up crewmen and scientific staff who were willing to risk their lives in "Deane's Bubble." Then Carol Bryant, who was both a gifted astronomer and a noted beauty, applied for a position on the satellite's crew list, and the difficulty of finding a staff suddenly dissolved.

Deane was a demon of activity. He arrived before daylight and seldom left the office before midnight. He took his meals, when he remembered to eat, amidst a battery of phones on his desk, and his wife had given up trying to reach him.

Two days before Launch Day, however, Lillian Deane arrived at the office and demanded that her husband see her. She was accompanied by Jim Briggs who was looking too neat and a bit sheepish. Deane had his secretary bring them in together.

At first Deane tried to carry off the interview lightly in order to get back as quickly as possible to the Bubble's launching. But he saw from Lillian's face and Briggs' formality that something much more important to them than Spacecraft, Incorporated, had brought them. He invited them to sit down.

As Lillian prepared to light her cigarette in its long holder, Briggs

bounced to his feet again to offer his lighter. Still standing, he turned to Deane.

"Before I say anything else, Ted—ah, Mr. Deane," he said, "I want to make it clear that, as of this moment, I no longer consider myself in the employ of Deane Aircraft or of any of its affiliates, or of yourself. I left a note to that effect on Miss Lighton's desk when I came in."

"Do you feel it's necessary to take so serious a step, Jim?"

"Yes. I do. It's the only way I can reconcile professional ethics with my desire to help Lillian."

So Briggs was now calling Lillian by her first name! Deane tried to remember if this was the first time such a thing had occurred. Trying not to let his annoyance show, he said, "I was wondering how you fit into the interview which seems to be coming up between Mrs. Deane and me?" It was ironic that Briggs should call her Lillian while he said "Mrs. Deane."

Lillian herself broke in.

"Let's not put too much emphasis on the personal side. I'm sure Jim doesn't want to stress it unduly. What we wanted to see you about is a business matter, after all."

"Fine," Deane said, "let's get down to business, then. I have a lot to attend to, as you know."

"Very well," Lillian replied. "I'm sure you recall my saying the other day that some sort of really serious personal income is necessary to my

security. More than ever since you've decided to throw away everything you own in this ridiculous attempt to outdo—and outspend—the United States Government."

"Yes, I remember the discussion. Well?"

"Well, do you intend to provide for me or not?"

"We've already covered the point, I believe, Lil. If you're asking again for an independent sixty thousand a year, I'm sorry, but for now at least, the answer will still have to be 'no'."

"We also covered the point that, for so-called tax purposes, I own quite a lot of Deane Aircraft, over and above my stock, that is."

At this Briggs cleared his throat and moved restlessly in his chair.

"Don't worry, Jim," Lillian said. "I'm not going to try to blackmail my husband. I know him too well for that."

"Just what is the point, then?" Deane demanded.

"Simply that if you won't set sixty thousand per year aside from this debacle, I want effective control of the firm. Not just paper. Effective control."

"Out of the question," Deane said.

"I see. And no question of a personal income, either?"

"None. After the satellite is up, we'll talk about . . ."

"I'm not inclined to wait for that."

"I don't see what else you can do, Lillian."

"What I can—and will—do is this: I shall notify the Director of Internal Revenue that as a major holder of Deane Aircraft and of Spacecraft, Incorporated, my opinion has never been asked nor my wishes taken into consideration in anything either firm has done. I shall point out that the present grandiose venture into space is against my will and better judgment and that, therefore, I consider the present tax provisions of the firms as little more than outright fraud."

Deane felt his palms go cold.

"Yes. I see. You could do that, I suppose. But to what purpose?"

"Simply that Internal Revenue, who are not likely to be bluffed or talked out of doing what they must, will stop you from spending the firm's assets on silly fireworks until they can collect their taxes. And when it becomes obvious that the Deane enterprises are on a sound, common sense footing again, my stock will go back up where it belongs and pay dividends on which I can decently manage my life."

"All you'll accomplish is to ruin me and yourself at the same time. The silly fireworks, as you call them, are set to go off in hardly more than forty-eight hours."

"And Jim can have Federal injunctions served on you by noon tomorrow. Isn't that right, Jim?"

"She's right," Briggs murmured, attempting a smile.

"I still don't understand," Deane flared, "just what you have to do in this discussion at all."

With an effort Briggs held on to his assurance.

"Simply that I mean to provide for Lillian myself, if she'll let me."

"I see." Deane turned to Lillian. "This too, Lil?"

"That sixty thousand would avoid such a lot of complications, wouldn't it?" she replied, standing up and closing her purse.

"That is blackmail, Lil. The answer is 'no' as you knew it would be."

Briggs picked up his hat. "Expect those injunctions by tomorrow noon," he said.

Deane rose and started around the desk, but Briggs did not wait to see what he might have intended. He was out of the office, hat in hand, before Lillian could have preceded him.

"You'd better rejoin your future protector, Lillian," Deane said.

When Lillian Deane left the office, her features were, for once, without their customary composure.

In the empty office Deane gave an explosive sigh and let his head fall on his arms. Now he must concentrate—*think*.

What Lillian had said, and Briggs had silently confirmed, was quite true. Internal Revenue would question the legality of those trans-

fers to his wife's name. He had had doubts about them himself, but his legal advisers, Briggs among them, had assured him that they were neither illegal nor unethical. So he had left that matter to experts and had gone on to other affairs.

The IRS would want to be certain that the space venture would not bankrupt him when he might have a huge tax bill to pay. In order to be sure, they would have to examine, painstakingly, every aspect of the operation from conception to completion on a paying basis. To do that they would have to have much more than the forty-eight hours that remained before the lift-off of the satellite. But if the lift-off was delayed, funds would quickly run out, contracts would expire, costs would mount up, and, even if Internal Revenue gave the go-signal at last, it would be too late to save the financial empire which alone could maintain the satellite in orbit until it began to pay.

That they could and would stop him with injunctions was sure. True, they had to serve papers on him personally. But he had to be in touch with the firm, the launching site, and with his technicians to supervise and to take final decisions on the launching. Could he be available to so many in the company without also, inevitably, being available to process servers?

Could he find legal talent who might beat Briggs and stave off Federal action until after the plat-

form was in orbit? Not in the time available. Briggs held all the trumps. A new man would not have time to grasp the elements of the problem, find and examine all the documents, and reach the authorities in IRS with convincing arguments before an irrevocable decision had been taken. No. That avenue was closed.

He might rake up the sixty thousand Lil was demanding. For this year at least. But an endowment which would provide that much in income would wreck the satellite more certainly than an anti-missile missile. Convincing her—and Briggs, damn him!—would also take time that the enterprise could not stand. Besides, yielding to blackmail was as repugnant as giving up the venture itself.

He was pacing the office, considering the failure and bankruptcy of his firm, the lost faith of millions of new stockholders, a setback for the exploration of space which might last for a hundred years, and making and casting aside more and more desperate plans, when Georgia Lighton came in quietly with a tray of sandwiches and a pot of coffee. He sank into his chair and gratefully accepted her silent ministrations—sugar and cream in just the right amounts, a fresh package of cigarettes, his desk lighter before him. She was turning to leave before he spoke.

"I'm in a mess, Georgia."

"Are we, sir?"

"Yes." He proceeded to sketch briefly and clearly, but without bitterness, the nature and size of the mess.

"So, would you buy more stock now, Georgia?" he asked.

"Certainly."

"In heaven's name, why?"

"Because you still have forty-eight hours, sir. I've seen you do some pretty difficult things in much less time than that."

Suddenly Deane felt a surge of energy and joy. Here was loyalty and confidence for you! He seized Georgia by both elbows, lifted her off her feet, and planted a hearty kiss on each of her bronzed cheeks. Before she could catch her breath, he plugged in his phone and was giving orders in rapid fire to Millie, the switchboard girl.

"Get a stack of sandwiches a yard high, Millie, and a drum of coffee. Tell Parker and all the department heads—never mind Legal—to be here in one minute. And tell a couple of the girls in the typing pool to be prepared to work all night." To Georgia he added, "The forty-eight hour countdown has begun!"

The brief conference that followed was dynamite. Deane opened it not so much with an idea as with a statement of intention. The group was won over at once by Deane's crackling excitement and certainty. Parker said, "It feels like old times!" and the discussion went on to ways and means. Georgia,

writing feverishly, got all the major points down in her notebooks. Files were brought, responsibilities were assigned, and precautions were taken that nothing should leak to the press until the proper time.

By four o'clock Deane's office was empty. So were the offices of most of the department heads. At four-fifteen, three of the company's helicopters had taken off for an unannounced destination. At five Georgia was seated at Deane's desk, two extra phones plugged in, and the door to the outer office firmly locked. She was relaying orders through the switchboard. At closing time most of the staff went home. Here and there, however, key personnel both in the offices and in the factory buildings were sending out for meals and thermos jugs of coffee. At eleven p.m. Georgia stretched out on the sofa for a few minutes, but at eleven-thirty she was on her feet again as two technicians came to install a closed circuit television. At three-oh-four in the morning the set came alive with a boom. Deane's face was grinning out of the screen.

"This is it, Georgia," he said. "The actual countdown has begun! Parker and a couple of the others will join you at the office in another hour. Have the guards let them in and then tell the head guard that no one—but NO one—comes in or out until the usual morning opening."

"Yes sir. And, sir?"

"What, Georgia?"

"Tomorrow morning I'm going to phone in an order for ten more shares of stock."

The "couple others" who came with Parker were all but two of the department heads. By opening time in the morning none of them had slept or shaved and the coffee pot had gone down to the canteen for the fourth time where one of the charwomen was pinch-hitting for the counterman.

Also by opening time word had got around that something unusual was going on at the launching site. Even on a day which was supposed to precede the launching, there was too much activity. It didn't take long for someone to guess—out loud—that the launching had been moved forward a day, and after that it took no time at all for reporters to appear. And with the first of the reporters came a grim little team of process servers from the Justice Department.

The job of the process servers was at the same time simpler and more complicated than that of the reporters. The reporters had to get some sort of story and as many of the story's details as possible. To do that they must run down all sorts of rumors. Having done so, however, even a negative story could be put on the wire and enjoy editorial attention for a while. The process servers, on the other hand, need only follow one trail: Where was

Deane? But they had to follow it to the end and actually find him.

Their search quickly narrowed to the launching site. It was obvious that Deane was directing operations from somewhere very near the blockhouse.

It didn't take one of them long to find a way into the launching site perimeter. The work was facilitated by the fact that the perimeter was not guarded, as it once would have been, by government security officers and Army detachments. The site was large, however, and Deane was in none of the obvious places. The legal bloodhound was therefore obliged to search the area methodically, and as rapidly as possible. While he did this, the preparations for launching went on around him. He could do nothing to prevent them from doing so unless and until he found Deane. Hardly any of the people working so furiously at the site knew who the Justice Department man was and what he was attempting to do, so that when he asked questions he usually got brief but accurate answers. None of those the process server asked, however, knew whether or not the Big Boss was on the site, or, if he were, where he might be located. But he might soon find one who did. It was becoming a sort of game of blind-man's buff—watched on the closed circuit set in Deane's conference room.

Parker, who knew the Justice

man, caught sight of him on the screen from time to time, and when he did so swore so luridly that some of the others were obliged to protest on Georgia Light-on's behalf. Their attention was much more closely focussed, however, on the actual launch preparations which were nearing completion.

The countdown had gone without a single hold. Instruments, lines of communications, fuel supplies, controls, weather, "home made" tracking network, everything was working together like the parts of a gyrocompass. Blast-off was only fifteen minutes away when the man bringing the latest pot of coffee to the conference room revealed himself as one of the band of process servers. He looked about the room disgustedly and, when he saw that Deane was not among the group around the TV screen, flopped into a chair at the table without being invited.

"If Mike doesn't get him at the launching site," he growled, wearily, "I'll get him when he comes in here."

One of the men at the TV set snorted, but no one said anything to him.

"Won't matter either," the process man continued, "if your rocket goes up or not. Once we get hold of Deane—and we will!—operations on the satellite and on everything else stop cold until the IRS straightens things out." He

hauled out a crumpled pack of cigarettes and settled down to watch the screen.

At that moment Deane's face appeared on the set. He was in a space suit and was headed for the rocket. As he turned to wave at the camera the Justice man left the office on the run, saying, "By God! He's going to fly it himself! If I can only get hold of Mike."

Ten minutes later the watchers around the screen were directing that the camera be swung alternately between the launching pad and the Justice man within the grounds. The camera quickly picked up the latter a hundred yards or so from the main gate just as a disturbance occurred there.

An unknown, burly-looking man, with ex-policeman written all over him, was arguing with the guard at the gate. Suddenly he opened his briefcase and, reaching in, handed the astounded guard an enraged tomcat! In the ensuing confusion, he slipped through and headed at a fast run for "Mike."

"Must be someone our recent visitor reached on the phone," Parker growled nervously.

"That's right," said a voice behind him as the Justice man slipped back into his chair.

"Got to give him 'A' for imagination, anyway," Parker admitted.

"Yeah," the man replied. "You ain't seen nothing yet. Now Mike knows where he's at, he'll get him. Watch!"

At that moment a voice from the screen said, "Tee minus two minutes, and counting."

Parker turned to the intruder. "There you are, Buster," he said. "Your friend Mike is two miles from the pad. Unless he can fly, he's had it."

Mike couldn't fly. Long before he had covered a quarter of the distance a cloud of pink orange flame burst from the pad and Deane was on his way into space.

The anxious minutes before a perfect orbit was reached were passed in a tense silence that even the disgruntled process hound respected. When it was announced, he joined in the cheers.

The TV screen showed the deployment of the balloon; then the screen switched to show Deane eerily floating within it. Bits of tissue-thin equipment floated about him like paper scraps in a goldfish bowl. Deane's voice could be heard over the radio link reporting every movement and action to the base. The depths of the bubble receded behind him like a vast cavern, lit with warm sunlight reflected by the plastic walls opposite one of the gas-filled blister-portholes.

How much time went by while they watched Ted Deane unfolding and inflating equipment, installing wall sections, and lashing down supplies with spidery lines, no one knew. But when he finally took off his space-suit helmet and

held up his thumb and forefinger in the circular sign of triumph, the conference room was crowded to overflowing. All six of the team of process servers were there.

Deane's voice came across space out of the set.

"Randy! You can tell them now," he said, and turning his back, he floated out of camera range.

Randolph Parker stood up amid an expectant silence.

"And what I'll tell you is this: Every one of the major stockholders of this company has transferred powers to Theodor Deane, President of the firm.

He intends to run Deane Aircraft—Spacecraft, Incorporated, from space itself. Where he is now. Anyone who wishes to serve an injunction on him to prevent him from doing so is welcome to go there and serve it. He will have to find his own taxi, however. The company will not furnish it. Deane will not come down until either the projected Space Platform is successful or the company is flat broke. If the Department of Internal Revenue wants to get anything it believes may be due to it, crew members, scientists, technicians, supplies, equipment, and further life-support systems must be orbited and taken into the Bubble, for the company will fail without them. So, I suggest we get on with the job—the stockholders will expect it of us."

One of the Justice men stepped forward.

"Mr. Parker," he said, "this is the first time in thirteen years that this team has failed to get its man.

And, to be honest, I'm almost glad of it."

He offered his hand to Parker.

"Where can I buy some of this 'Spacecraft' stock?" he said.



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This story—written before the recent death of four astronauts, one Russian, three American—inquires into the “quality” of a hero’s death.

Moondust, the Smell of Hay, & Dialectical Materialism

by Thomas M. Disch

I

HE WAS DYING FOR SCIENCE.

This was, in fact, the very mausoleum of natural philosophy—all those great and long-ago intelligences metamorphosed here into rockpiles: Harpalus, Plato, Archimedes; Tycho, Longomontanus, Faraday; and, on the face turned away from Earth, a ghostly horde of his own countrymen—Kozyrev, Ezerski, Pavlov. An honor, therefore, to be the first, the very first, to join them thus corporeally, like Ganymede lifted living up to Olympus.

Nine minutes.

And what a wonderful thing it

was, what an endless source of enlightenment, to know the exact color of the crater Ptolemaeus—gray—to measure more precisely than ever before the height of its ringwall—1.607 kilometers—to collect the samples of gray dust, to chip off chips of gray rock, to sample, to weigh, to analyze, adding always a little more data to the data there already was, expanding the horizons of the known world, today the moon, tomorrow Mars, on to the farthest stellar vanishing point where time lost itself in the triumph of entropy. Wonderful.

Ah, but there, like the skull in

the cell of a Carthusian monk, was that dread word again: entropy. Why must that be the last word science had to say on every subject? What benefit to know that the universe, like man, was mortal? That some day the earth would have no more verdant landscapes than these of Ptolemaeus, that the sun would die, that there would be, at the end of all things, nothing, nothingness, mere death?

Death: no matter how many times he said the word his mind could not encompass it. Only the dead know what death is. And yet he would die in nine, no in seven and a half minutes. And neither he, Mikhail Andreievich, nor anyone knew why. A faulty control element, a small breakdown that is unreported, which then compounds itself. But that too was what was meant by entropy.

He walked on through the crater, away from the ship that had betrayed him, legs bowed wide in the bulky suit so that he looked like an injured soccer player leaving the field, careful not to let any drop spill from his cup of pain. He gathered up the last canister of dust and returned with the tray to the ship. Inside his helmet the communicator bleated for his attention. Six minutes. A little less than six minutes.

If I held my breath . . . he thought.

One by one he took the canisters from their tray and emptied

them over the shoes of the puffy, bright-yellow suit. The moondust fell as straight and swift as a rock, with no trace of colloidal softness. An empty gesture. He faced the east where the crescent earth hung low on the horizon. Russia lay now within the dark, nighttime area of the crescent.

And that was empty too, all space was empty, and the earth only a rotating sphere in that void, the moon another, the sun and stars balls of hot gases. To think of it! To think that he would die because he had no more oxygen to feed his blood cells. To think. . . .

But there was not time to think of everything. Soon, quite soon, he would have to stop thinking altogether.

The communicator continued to buzz.

Flies buzzing about a carcass. There could not be flies on the moon, though, since it lacked an atmosphere. There could not be life here, of any sort. All the lovely stories that could not be true because life could not exist on the moon. Even his own life, his own lovely story.

He realized that he was holding his breath, trying not to breathe. The dumb beast beneath his conscious mind still believed it would be saved. Poor brutish thing. Like his mother, kissing an icon with her last breath, while the intelligent gray eyes confessed that *they* knew there would not be another

II

life. The lips believe, the eyes deny.

He tongued the communicator on. "Yes?" he said.

"Oh Mikhail! We were worried. We thought. . . ." Tonia's pleasant contralto was still recognizable across the 240,000-mile vacuum.

"No, not yet."

"We've found out what was at the root of the problem. As Dmitri first insisted, the third fuel injection unit wasn't in sync with—"

"Please, Tonia. It can't help me now to know *that*." His emphasis implied that there was, after all, something that it would help him to know.

There was a silence before Tonia spoke again. The change in her voice suggested that she had been crying. "We all think that you've been so gricky crack."

"So brave?" he asked, interpreting the static. "Is it brave to go on eating and drinking while there's food left? Is it brave to breathe? That's as brave as I've been."

"What did you say, Mikhail? We lost you for a minute."

"Nothing."

"Assya sends her love, Mikhail."

Four minutes.

"Send my love to Assya." He tongued off the communicator, thinking how like a kiss it was, and how unlike.

No, he was not dying for Science, for Science is not a good reason for dying.

He was dying for Love.

Had he not told himself, during that long-ago summer, that *now* he might die without regret, that anything more would be superfluity? And had she not been boundlessly beautiful, his Assya? The skin smooth and clear as the rind of an unflawed pear, the swift uncertain smile, the smell of hay in golden hair, the infinite perspectives of her gray eyes. Would not a single memory of Assya, the remembered warmth of that one summer, have supplied reasons enough for a lifetime?

But that is passed, he objected, *and of the past*.

Truly. As well try to hold still the turning world as keep loveliness, or love, from passing. It passes in years or in an evening, but it passes. There was no beauty, no nobility, no human worth that was not ephemeral. There is an entropy of the spirit to match the entropy of the world. Like her once-firm flesh, Assya's character had grown flabby with lack of exercise. For Assya, as for most people, death did not come at once, but by degrees. Love? No, there was none left now.

And yet the grass had been so green that summer. The sun had seemed to pour forth streams of liquid life. Lifting the bales of hay, working beside Assya in the heat, forgetting for the time being

the pressures of the university, forgetting everything but their two bodies and the ambience between them, love, then time had been kindly and the black vault of the heavens only the canopy for their private delights. Oh yes, an idyll.

But long, long ago.

Now the fields where they had worked together would be wrapped in the ice-cocoon of winter, and, had the land not lain within the horns of the crescent, he might see it glisten as now the northern part of Europe glistened as it received the morning sun.

The earth died each year, but after a season of cold it rose to new life. His winter would not pass, but what of that? Could not he rest content with a single summer, a glint of the sunlight, one kiss? What would repetition add to what he already possessed?

Words. There was no consolation in words.

"Assya," he whispered in a voice aching with regret and—though he would deny it—envy. For she would stay behind; he would die.

A minute and a half.

The communicator was buzzing.

If only he could have gone out in a burst of glory, bright with a moth-like martyrdom, instead of lingering on a week, another week, to witness the diminution of all magnanimity, all love.

No, he was not dying for Love, for Love is not a good reason for dying.

III

He was dying for the State.

Science is impersonal. Love has a way of dying before lovers do. But there are ideals—he told himself—that possess the authority of the former without abandoning the essential humanity of the latter. He was, as any astronaut must be, something of a patriot—even in a small way a fanatic. He had been, since his eighteenth year, a Party member, which is not at all an easy nor a usual thing for a student carrying a curriculum top-heavy with math and physics.

He believed, with something like religious fervour, in the future of his country, in its destiny. He was proud—as what Russian could not be proud?—of what had been done in five trifling decades, despite the forces that had always been arrayed against them, forces so great that even now, regarding the green globe swinging above the lunar horizon, he could not repress a small feeling of paranoia. Yet despite all this, despite all that *they* could do, it had been Russia, his own Russia, that had reached the moon first and put a man on it.

Though no one would ever know now that that man's name had been Mikhail Andreievich Karkhov. Only after his successful return to Earth was the news of the Soviet Union's great coup to have been made public. A failure would not be acknowledged, since it would

not serve the national interest to make it public. And was not the national interest his own?

And yet he would have liked to have been known. A weakness.

Had not most of the martyrs of the Revolution, or of Stalingrad, died obscure deaths? Were their sacrifices less valuable because their names had been lost? He wanted to say *no*, but his lips stayed firmly pressed together.

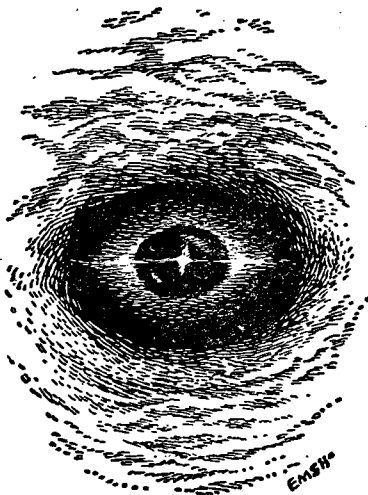
What if he *had* succeeded? What if he *had* become a hero? Would that have altered the fact that he must die, and that in the

face of death nothing is glorious, nothing is proud, nothing is of worth but a little more life, a few seconds, another breath.

No, though he wanted to, he was not dying for the State.

The oxygen was gone. He looked, uncomprehendingly, one last time at Earth, then, ignoring the buzzing of the communicator, he loosened the screws that held the faceplate of the helmet closed.

Then he was dead, and, though he did not know it, there is never a good reason for dying.



Here is the chilling diary of a patient in a mental hospital, where the food is good, the wards are done in calm colors, and the staff is inhuman . . .

ARGENT BLOOD

by Joe L. Hensley

APRIL 13: TODAY I MADE A DISCOVERY. I was allowed to look in the mirror in Doctor Mesh's office. I'm about forty years old, judging from my face and hair. I failed to recognize me, and by this I mean there is apparently no correlation between what I saw of me in the mirror and this trick memory of mine. But it's good to see one's face, although my own appears ordinary enough.

I must admit to more interest in the pretty bottles on Doctor Mesh's shelves than my face. Somewhere in dreams I remember bottles like those. I wanted the bottles so badly that a whirling came in my head. But I didn't try to take them, as I suspected that Doctor Mesh was watching closely.

Doctor Mesh said: "You're improving. Soon we'll give you the

run of our little hospital and grounds, except, of course, the disturbed room." He pinched me on the arm playfully. "Have to keep you healthy."

I nodded and was delighted and the sickness inside went away. Then I could take my eyes off the shelves of bottles—nice ones full of good poisons—some that I recognized vaguely, others that struck no chord.

There would be another time.

Later I went back into the small ward—my home—the only one I really remember. Miss Utz smiled at me from her desk and I lay on my bed and watched her. She has strange, bottomless eyes. When I see her, the longing to be normal again is strongest. But the disturbances recur.

My ward is done in calm colors.

The whole effect is soporific. I'm sure I never slept so much or dreamed so much. Bottles, bottles.

The food is good and I eat a great deal. My weight seems to remain fairly constant, decreasing when I'm disturbed, coming back to normal when released.

My fellow patients are not so well off. Most of them are very old and either idiotic or comatose. Only the man with the beard is rational enough to talk to sometimes.

The bearded man saw me watching him. "Pet!" he yelled at me. He makes me very angry sometimes. He's always saying that to me when he's disturbed. I wonder what he means?

I shall quit writing for the day. Doctor Mesh says it's good to keep a diary, but I'm afraid someone will read this. That would anger me, and extreme anger brings on disturbances.

I'm sleepy now.

April 18: I've got to stop this sort of thing. I tried again with the bearded man, but he won't drink water that he hasn't freshly drawn. I think he suspected that I'd done something, because he watched me malevolently for a long time.

I came out of the disturbed room yesterday, sick and weak, remembering nothing of that time.

No one seems to have found the bottle I hid the day I became disturbed, a bottle empty now down to the skull and crossbones, but to

no purpose except the bearded man's anger. I wonder why Doctor Mesh angers me so? And Miss Utz? I guess it must be because they move and talk and exist. The old ones who don't move and talk to me don't anger me—only the bearded man and Doctor Mesh and Miss Utz.

But nothing seems to work on the Doctor or Miss Utz and the bearded man is very careful.

Today, at mid-morning, Miss Utz helped me down to the solarium and I sat there for awhile. Outside, the flowers have begun to bloom and some minute purple and green creepers are folding their way over the walls around this tiny asylum. They look very good and poisonous.

My neck itched and I scratched at the places until they bled and Miss Utz laughed her cold laugh and put antiseptic on my neck. She told me that this is a private asylum run on private funds, taking no patients but hopeless ones that have been confined elsewhere for years before transfer here. If that is completely so, then why am I here?

In the afternoon Doctor Mesh tested my reflexes and listened to my heart. He says I'm in good physical condition. He seemed happy about that. He was evasive when I asked him if I'd ever be well and that made me angry. I managed to hide all outward signs of my feeling.

When I was back in the ward

and Miss Utz was temporarily out of sight, the feel of the poison bottle comforted me.

April 30: The dreams are growing worse. So clear and real. I dreamed I was in Dr. Mesh's office. I could see the pretty bottles on the shelves. Miss Utz and Doctor Mesh were reading my diary and laughing. The bearded man kept screaming at me from far away. The dream was very real, but my eyes would not open.

This morning the bearded man is watching me from his bed. He looks very weak, but he had a disturbance this week. Being disturbed is very hard on one, Doctor Mesh once told me.

I was in Doctor Mesh's office for a while earlier and got to look in the mirror. I did not recognize me again. Sometimes I feel as if my head had been cut open, the contents scrambled, and then re-capped. There is no pain, but there is no place to search for things.

A little while ago I tried something from the new bottle that I'd taken from Doctor Mesh's office. It didn't work. Nothing works—even though I saw Miss Utz drink some of the water.

May 2: I shall have to hide this diary. I'm almost sure they are reading it. They brought the bearded man back from "disturbed" today. His eyes are red and sunken

and he kept watching me all morning. When Miss Utz left the ward he beckoned me over with an insistent finger.

He said nothing. Instead he lifted his beard away and pointed at his throat. I looked at it, but could see nothing but some small, red marks, as if he'd cut himself with his fingernails. He pulled one of the cuts open with hands that shook and a tiny dribble of blood pulsed out. He laughed.

I looked away, the blood making me feel ill.

The corner of one of the pages in this diary is torn. I didn't tear it.

May 3: I talked to the bearded man today—if talk can describe the conversation we had. He's insistent. He said I can't know when they feed on me as I'm in a sort of seizure and that I'm their "pet" because I'm young and strong. He made me check my neck and there are red marks on it. He said they let me steal the poisons because they know I can't harm them.

He told me I killed three people outside, poisoned them. He says I was a pharmacist outside, but now I'm incurably insane and can't ever be released. He said I was in a state hospital for years before I came here. I don't remember it.

He claims that Doctor Mesh and Miss Utz are vampires.

I went back to my bed when he let me get away and spent a fairly restful afternoon. I dreamed of

bottles on the shelf and something came to me in the dream—a thing all perfect like myself.

The bearded man says that we could kill them with silver bullets, but the thought of a gun is abhorrent to me.

I've never really believed in that sort of thing, but what if the bearded man is right? What if Doctor Mesh and Miss Utz are vampires. This place would be perfect for them. No investigation of death, no legal troubles, patients forgotten years ago. Take only the incurables, the forgotten. A regular supply.

But the plan, so intricate and perfect. I will have to have the bearded man's help. He will have to steal the things I want. If they are watching me, laughing when I steal from them, it would be too risky for me to take it.

May 4: We began the plan today. The bearded man managed to steal the large bottle of saline solution and the tube and needle to introduce it into the veins. He also managed the other part. The chemical was where I'd described it as being on Doctor Mesh's shelves. I even had the color of the bottle right. Now we must wait for the right time. Perhaps tonight?

I shall hide this book well.

May 6: I am in fever. We did

not manage until last night, and it took a very long time. I feel all steamy inside and there is a dizziness.

I'm trying for anger and a disturbance. Miss Utz is watching from her desk, her eyes hot and bright.

They will take me to the disturbed room.

May 9: A few lines. I'm ill. Nothing seems to be working inside me and the heat is such that my eyes see more brightness than shade. I'm in the disturbed room and I've seen no one alive all day. I can hear the bearded man's whiny laugh and once I heard him clap his hands.

I think they are dead. They must be dead.

We put the silver chloride in the saline solution and put the needle in my arm and let it all flow inside. When I was disturbed they must have fed on me.

If I rise up I can see the toe of a female foot right at the door and it's all curled and motionless. I can't see Doctor Mesh, but he must be there in the hall near Miss Utz.

Dead of my poisoned blood, my fine and intricate blood. A new specific for vampires. *Silver Blood.*

I wish this heat would go away. Three outside and two in here. I want there to be time for more . . .



KALEIDOSCOPE IN THE SKY

by Isaac Asimov

I RECENTLY PUBLISHED A BOOK called *The Universe* which garnered me a sort of back-of-the-hand from one reviewer who wanted his science more richly interlarded with exclamation points than I usually see fit to insert. Scientific facts and reasoning are all very well, he seemed to think, but he was anxious to have more gasping and panting, and less cold-blooded explaining.

The way he put it was this: "So while it's nice to have an up-to-date compendium . . . it would have been even nicer to have emerged with at least a whimper of awe and not such a bang of statistics."

There's not much one can do, I suppose, if one happens to be reviewed by someone who's fond of whimpering, but I'm afraid I'm not going to oblige him. It is my firm belief that statistics, properly presented, have within them all the awe anyone needs; and that the Gentle Reader can pick out that awe for himself and doesn't need me to do any whimpering for him.

I'd tell this to the reviewer but he bravely omitted to put down his name.

Anyway—to pick a subject at random—let's consider the two satellites of Mars and see what the bang of statistics can tell us concerning them.

We'll begin with the matter of distances. Phobos, the closer of Mars' two satellites, is 5,700 miles from the center of the planet. Since Mars has a diameter of 4,200 miles, its surface is 2,100 miles from its center. This means that Phobos is only 3,600 miles above the Martian surface. Deimos, the farther of the satellites, is 14,600 miles from Mars' center and 12,500 miles from its surface.

Mars' satellites are much closer to the planetary surface than our Moon is to the Earth. Paradoxically, this makes them less easy to see in some ways, for the bulge of Mars' own curvature gets in the way.

The bulge of our own planet does not interfere with the visibility of the Moon. The Moon is so far from us that it can (so to speak) shine past the bulge of the Earth's surface. If our Moon were shining directly over the Earth's equator, it would be visible nearly to the poles. Only within half a degree of either pole would the Moon be below the horizon, hidden by the full extent of Earth's bulge.

But then, the Moon's orbit is tipped 18° with relation to Earth's equator, so that it can shine directly over any latitude from 18° N. to 18° S. at one time or another. This tilt is more than enough to make the Moon fully visible at either pole. In short, there is no spot on Earth from which the Moon cannot be seen.

The orbits of the Martian satellites, however, are almost exactly in Mars' equatorial plane. Phobos' orbit is tilted to that plane by only 0.95° and Deimos' orbit by 1.3° . This is not enough to overcome the interference of the bulge of Mars' curving surface, to which the Martian satellites are so close.

From any place beyond 83° N. or S. on the Martian surface, Deimos, the more distant satellite, is never seen. For Phobos, the closer satellite, the situation is even more drastic. Beyond 69° N. or S. on the Martian surface, Phobos is never seen. This means that from 0.7 percent of the Martian surface one can never see either satellite. From an additional 6 percent of the surface one can see only Deimos, never Phobos.

The two satellites together can be seen only from 92.3 percent of the Martian surface, and anyone building tourist resorts on Mars (some day) had better keep this in mind.

Now let's try something else. Phobos makes a full swing about Mars in 7.65 hours; Deimos in 30.3 hours. These are the "sidereal periods"; that is, the time it takes for a satellite to move from a position exactly over some particular star, completely around the sky and back to a position exactly over that same star.

This period with respect to our own Moon is 27.32 days, yet that is not the length of the month as we ordinarily think of it. What interests us about our Moon's period are its phase changes, and that depends upon its position with respect to the Sun and not with respect to some star. The Moon is "full" when it is exactly on the other side of the Earth from the Sun.

Let us say that when the Moon is "full" it is also immediately in front

of a particular star. In 27.32 days it will be in front of that star again, but it will *not* be exactly opposite the Sun this time. In the 27.32 days it has taken the Moon to make its circuit, the Sun will have moved somewhat against the background of the stars as a result of the Earth's revolution about the Sun. It will take additional time for the Moon to make up this added distance and reach the point opposite the Sun again. For that reason the period from full Moon to full Moon is 29.53 days. This is the "synodic month."

It is only fair to ask then if there is an equivalent difference between the sidereal period of Mars' satellites, which is the period usually given, and some synodic period from which we ought to calculate phases.

Well, the size of the difference between the synodic period and the sidereal period depends on how far the planet moves in its revolution about the Sun while the satellite is completing one turn about its orbit.

The closer a planet is to the Sun, the more rapidly it curves about its orbit and the more rapidly the Sun appears to move against the starry background in the planet's skies. On the other hand, the farther the satellite from a planet, the longer it takes to complete an orbital turn and the greater the distance the planet moves about the Sun.

To have a small difference between synodic and sidereal periods, then, you want a planet that is distant from the Sun and a satellite that is close to the planet.

Since Mars is farther from the Sun than the Earth is, and since its satellites are considerably closer to it than the Moon is to the Earth, the difference between synodic and sidereal periods should be much less for Phobos and Deimos, than for the Moon. And this is so.

Where the synodic period of the Moon is 2.2 days longer than its sidereal period, the synodic period of Deimos is only 3.6 *minutes* longer than its sidereal period. This means that Deimos, having made a complete turn about Mars, need only travel an extra 3.6 minutes to catch up with the apparent motion of the Sun in the Martian sky during the interval of the satellite's orbital circle.

Phobos, which is closer to Mars and makes its turn more rapidly, need move only for 14 additional *seconds* to catch up to the Sun. It follows, then, that we can dismiss that particular complication and consider the period of the Martian satellites as, in effect, both sidereal and synodic.

Suppose we were standing on the equator of Mars, and suppose Mars was not rotating but was remaining motionless with respect to the stars. We would see Deimos rise in the west, cross the sky, pass directly overhead, and set in the east.

Does that sound queer? Does it sound odd to talk of rising in the west and setting in the east? That is just what would happen under the conditions given, for Deimos circles Mars west-to-east.

This is the common state of affairs. Phobos circles Mars west-to-east, too, and the Moon circles Earth west-to-east. In fact, almost all the satellites circle their planets west-to-east. The few that do not (such as Phoebe, Saturn's outermost satellite) are said to have "retrograde orbits."

Yet if our Moon moves in its orbit west-to-east, why does it rise in the east and set in the west? If it is really moving west-to-east, why does it visibly move east-to-west?

The answer is that we are not standing on a planet that is motionless (as I imagined Mars to be a few paragraphs ago). The Earth is rotating about its axis in a west-to-east direction. (Planets that rotate east-to-west, as Venus does, have "retrograde rotation.")

Earth's rotation carries us west-to-east far more quickly than the Moon's orbital motion carries it west-to-east. Earth makes one complete rotation in one day, while the Moon makes one complete orbital revolution in 27.32 days.

As Earth rotates merrily onward, we on its surface overtake the Moon easily and leave it far behind. Of course, we don't sense ourselves moving at all. To ourselves, it seems merely that the Moon is moving backward—that is, from east-to-west. In short the Moon circles the Earth west-to-east relative to Earth's center, but east-to-west relative to a fixed point on Earth's surface.

If the Moon were motionless, Earth's surface would make half its turn in just 12 hours, and the Moon would seem to move from Moon-rise in the east to Moon-set in the west in just those 12 hours. However, in those 12 hours, the Moon has moved a little bit west-to-east and the Earth must turn about 25 minutes more to make up for that.

For this reason, there are roughly $12\frac{1}{2}$ hours from Moon-rise to Moon-set and another $12\frac{1}{2}$ hours from Moon-set to the next Moon-rise. This makes about 25 hours from one Moon-rise to the next, which is why the Moon rises one hour later each night. (Actually, this nightly delay in Moon-rise varies through the year because of the eccentricity of the Moon's orbit and of the tilt of its orbital plane, but that need not concern us.)

Let's get back to Deimos. If it circles about Mars in just 30.30 hours, it turns through 360° in that period. In each hour it moves west-to-east through an angle of 11.9° . At the same time, though, Mars is also moving west-to-east in a rotation that takes it 24.62 hours. Mars rotates through an angle of 14.6° in one hour.

The effect of Mars' rotation about its axis, to a person standing on the Martian surface, is to impart an apparent east-to-west motion to Deimos.

Deimos, then, is simultaneously affected by two shifts in position. In one hour, there is an 11.9° shift west-to-east because of its own orbital motion, and a 14.6° shift east-to-west imposed upon it by Mars' rotation. The resultant of these two shifts is that Deimos, as seen from the surface of Mars, moves 2.7° east-to-west in each hour.

In other words, Mars turns a bit faster than Deimos moves, so that the planet's surface overtakes the satellite, but not very rapidly. To an observer on the Martian surface, Deimos therefore seems to move backward (east-to-west) but, as aforesaid, not very rapidly. Indeed, if Deimos moves 2.7° east-to-west, it takes 133 hours to move through 360° and turn completely around Mars relative to a fixed point on its surface.

An observer on the Martian equator would observe Deimos rise in the east, move slowly westward until, after about 33 hours, it would be directly overhead. Another 33 hours would see it set in the west. It would then be fully 66 hours before it would rise again.

Suppose Deimos were a little closer to Mars than it is. It would then move about Mars a little more rapidly west-to-east than it now does. The rotating surface of Mars would overtake it with even greater difficulty so that Deimos would seem to move east-to-west even more slowly.

If Deimos were sufficiently close to Mars, the satellite would turn about Mars west-to-east in exactly the same time it takes Mars to turn about its axis. Satellite and planetary surface would remain neck-and-neck forever. From Mars' equator, Deimos would seem motionless.

If the observer happened to be on that part of the Martian equator which was directly under Deimos, he would see Deimos directly overhead eternally. If he travelled to other parts of that side of Mars, he would see Deimos lower in the sky in some particular direction. From one half of the Martian surface he would never see Deimos at all; it would be on the opposite side of the planet.

This is what would happen if Deimos were 12,710 miles from the Martian center instead of 14,600 miles. It would then have what is called a "synchronous orbit."

Any planet has a position for a synchronous orbit. Earth's period of rotation is about the same as that of Mars, so you might expect a synchronous orbit in the same position. If so, you'd be wrong. Earth is more massive than Mars and has a stronger gravitational field. It can whip a satellite about itself in 24 hours at a greater distance than Mars can. For Earth such a synchronous orbit would be 26,300 miles from the center of the planet, rather than 12,710 miles.

We have no natural satellite at that distance but we can (and have) put man-made satellites at just that distance. If the orbit of a synchronous satellite is not quite circular, or if it is tilted to the equator, the satellite would seem to oscillate about some central point, in ellipses, figure-eights and so on, but it would never make a complete circle about the planet.

Satellites in synchronous orbit would be of particular use in communications, since one that hovered eternally over the Atlantic Ocean, for instance, would be ever available for messages back and forth between Europe and the United States.

Let me forestall one inevitable question at this point. Someone is bound to write and ask me how a satellite can hang motionless over a given spot on the Earth without falling.

The answer is that a satellite in synchronous orbit is motionless only with respect to a fixed point on the turning surface of the planet. It is moving rapidly around the planet, relative to the planetary center, and that is what counts.

Now let's pass on to Phobos. Phobos is closer to Mars than Deimos is; quite a bit closer. Phobos therefore moves about Mars west-to-east much more rapidly than Deimos does. In fact, it moves about Mars west-to-east more quickly than Mars rotates west-to-east.

This fact is usually presented in introductory astronomy texts in a kind of breathless fashion, as though it were very odd of Phobos to do this; perhaps even rather talented of it. My friend the reviewer might even whimper over it.

Actually, it is not odd at all. It is inevitable! Any satellite will outrace a planetary surface if it is close enough to the planet.

I have already said that if Deimos were 12,710 miles from the center of Mars, it would be in synchronous orbit and would move west-to-east in such a way as to turn about Mars at just the rate that Mars itself turns about its axis. If Deimos were still closer to Mars, it would move still faster and would move about Mars *faster* than Mars moves about its axis.

This is true of *any* satellite that is closer to its planet than the synchronous orbit. The only sizable natural satellite of any planet that happens to have a known orbit closer than synchronous is Phobos. That is what makes Phobos unusual—its closeness to its planet. Once that closeness is granted, the fact that it makes an orbital turn faster than the planet makes an axial turn is inevitable.

Thus, Saturn has a set of rings, the inner portions of which are closer

than synchronous. While Saturn rotates on its axis in 10.6 hours, the innermost portions of the ring make turns about Saturn in less time.

Again, the distance of our own synchronous orbit is 26,300 miles from Earth's center. Any satellite closer to Earth than that *must* revolve about Earth in less than 24 hours; hence in less time than it takes for Earth to turn on its axis. Most of our artificial satellites are indeed closer than synchronous and therefore do indeed move about the Earth in less than 24 hours. The closest satellites move about the Earth in 1.5 hours.

To be sure, the faster a given planet spins about its axis, the closer to itself is the synchronous orbit. There is no known reason, in theory, why Earth might not rotate in ten hours rather than 24. If it did so, the synchronous orbit would be only 14,600 miles from its center. Indeed, if the Earth rotated about its axis in 1.5 hours, the synchronous orbit would be 4,000 miles from its center, or right at its surface.

If Earth rotated about its axis in 1.5 hours, no satellite could possibly turn about the Earth more rapidly than it rotated on its axis. However, when a planet's surface is at synchronous orbit, its equatorial region moves into orbit, if it is not nailed down. (Another way of putting it is that the centrifugal effect would just counterbalance gravitational force.) If Earth rotated on its axis in 1.5 hours, its ocean would be sucked off the surface.

We know of no body that is turning so rapidly as to be coming apart at the equatorial seam, and therefore we know of no body which can't have some satellite closer than synchronous.

But back to Phobos—

It moves about Mars west-to-east in 7.65 hours and therefore covers 47° west-to-east in each hour. Meanwhile, the Martian surface is moving the observer 14.6° west-to-east in each hour. That is not enough to overtake Phobos, but it does cut its speed somewhat. Instead of Phobos moving 47° west-to-east, it moves 32.4° west-to-east in that hour.

But it is still moving *west-to-east*. That means that despite Mars' spin, Phobos rises in the west and sets in the east. Again, this is not clever or perverse of Phobos. It is the inevitable consequence of having an orbit closer than synchronous. All our satellites (except a small number of really distant ones) rise in the west and set in the east—provided they are hurled into a west-to-east orbit in the first place.

If Phobos moves 32.4° in one hour, it makes a complete turn about Mars, relative to a fixed point on its surface, in 11.1 hours. It rises in the west, is overhead 2.8 hours later and sets after having been in the sky a total of 5.55 hours.

What's more, every 10.3 hours Phobos overtakes Deimos and passes within a couple of degrees of it. (Sometimes it must even eclipse Deimos.) While Deimos remains in the Martian sky for a long time, moving slowly east-to-west, Phobos races by six times (sometimes seven) during that interval, making near-contact each time.

But what about the phases of Phobos and Deimos? The full cycle of phases takes place in the course of the satellites' period of revolution relative to the Sun, not relative to a fixed point on the planetary surface.

While it takes Phobos 11.1 hours to circle the Martian sky, it takes it only 7.65 hours to go through its full cycle of phases.

Suppose, for instance, that Phobos rises above the western horizon in the new-Phobos phase. For that to happen, it must rise just as the Sun is setting. (It is not likely to be exactly in front of the Sun, since the Sun's apparent orbit is tipped 24° to that of Phobos and the two may pass each other with quite a gap. This is also true of our own Moon and the Sun, which is why we don't have an eclipse of the Sun every time we have a new Moon—but that's a different subject.)

Anyway, if Phobos rises as the Sun is setting, the satellite rapidly waxes as it rises above the horizon and the Sun moves below it. By the time Phobos has passed the zenith and is half way down toward the east, it is exactly opposite the Sun, which is now well down Mars' other side, and the satellite is at the full-Phobos phase. When Phobos sets in the east it is in its third-quarter and appears as a half-Phobos.

And Deimos? While it remains in the sky 66 hours, it goes through its full cycle of phases in 30.3 hours. If it rises in the east as new-Deimos, it reaches full-Deimos while it is half-way up toward zenith and is new-Deimos again just short of zenith. In fact, it goes through its full set of phases more than twice while it is in the sky. It does this, of course, because Mars' rotation brings the Sun across the sky twice while Deimos is shining there.

So far, things seem pretty exciting. Just imagine two moons of which one stays in the sky practically forever, changing phase as you watch, while the other chases across the sky like a speed-demon—and in the wrong direction, too. And then there is the Sun moving east-to-west over twice as rapidly as Deimos.

But there is one great shortcoming—the size of the satellites. They are tiny. Deimos is only six miles in diameter and Phobos only ten. Even allowing for their closeness to the Martian surface, such bodies can scarcely make an impressive appearance.

For comparison, the Moon's apparent width is 31 minutes of arc. —Well, it turns out that Phobos, when directly overhead, at a distance of 3,600 miles above the Martian equator, has an apparent width of only 10 minutes of arc; that is, only $\frac{1}{3}$ the width of our Moon.

The total apparent area is $\frac{1}{9}$ that of the Moon, but it can't be $\frac{1}{9}$ as bright as our Moon. It is further from the Sun and receives less light. It receives only 0.43 times as much light as the Earth-Moon system does and if Phobos is no more efficient than our Moon in reflecting light, then Phobos, when directly overhead, is only $\frac{1}{20}$ th as bright as our Moon.

As for Deimos, which is smaller than Phobos and more distant, it would appear as a spot of light only 1.6 minutes across. It would look like a fat star about $\frac{1}{240}$ as bright (at best) as our full Moon. Its phases would not be visible and it would merely grow dimmer as the Sun drew closer.

That is rather deflationary. Mars' two moons become two small bodies, one no more than a planet-like point and the other a visible globe, but one that is quite small and dim.

Still, let's stop and consider. Even though Deimos is only $\frac{1}{240}$ as bright as our full Moon, it would be nearly ten times as bright as Venus (at its brightest) appears to us. It would be a rich and beautiful diamond in the sky, better than anything of the sort we could find in ours.

As for Phobos, that might be a small globe, but it would have certain special points of interest. At the horizon, the observer would be viewing it across Mars' thickness and it would be distinctly farther away than when it was shining directly overhead. When rising, then, Phobos would have an apparent diameter of a little under 6 minutes. As it rises from horizon to zenith, it therefore not only changes phase, but it grows visibly larger, nearly tripling in total area. Then, as it sinks toward the eastern horizon it would grow perceptibly smaller again.

(I wonder if the horizon illusion that makes our own Moon seem so enormous when it is near the horizon would operate on Mars, too. It would be a pity for it might just mask the real change in size of Phobos.)

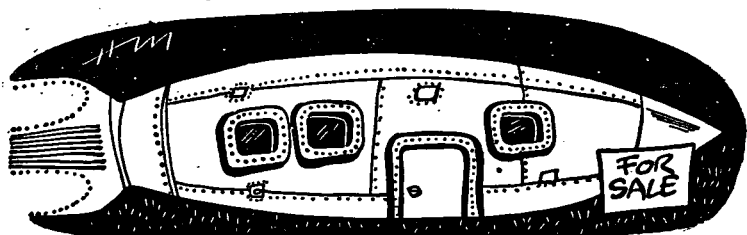
Take this combination of changing phase and diameter, of wrong-way motion, of constant glancing passages near Deimos, and of frequent dimming as it approaches the Sun and brightening as it leaves it; and Phobos would clearly have an interest and variety our Moon couldn't possibly have, despite its greater size and brightness.

And there's more, too. Phobos is so small that its gravity is not likely to force its substance into a sphere. It can very well have an irregular

shape. The asteroid, Eros, which is of the same order of magnitude as Phobos, is known to be brick-shaped, for instance.

It might be, then, that Phobos will be seen not as a circle of light, but as an irregular lump upon which the interplay of light and shadow will produce a fascinating display of kaleidoscopic change that will never exhaust the fancy.

That's what the bang of my statistics tells me; *that's* the kind of kaleidoscope in the sky it shows me. If my friend, the nameless reviewer reads this, he can whimper in awe if he wishes; I prefer to cheer with delight.



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If a kid brother comes along when you're about five, it's okay, because then he's just another new little animal that's soft and warm. And it's okay if one comes along when you're about fifteen, because you can play papa. But—ten? No, that's altogether the wrong time . . .

QUICK WITH HIS HANDS

by Avram Davidson

ONE OF THOSE UNINVITED world-traveler types who comes by every now and then and tells you a lot of stuff you already know or else don't want to, he said that the Johnson Sea was "as dry as an Australian lake." Supposedly funny. And not even particularly accurate. Australian lakes are at least wet sometimes, but the Johnson Sea never is, and it probably never was. It's just a big, wide, sort of slightly sunken-in area, hundreds and hundreds of kilometers in every direction from Mars Six, where our dome was. My brother Eddy was born there, seven years ago, when I was ten. Altogether the wrong age. I forget exactly what they used to call the Sea on the old maps before anybody actually ever got here. Mare Nauseam or something classical like that, probably.

Depending on the time of day and on the, ha ha, atmospheric conditions, and even a little bit on just where you are, the Sea ranges in color from dull tan through dull yellow and dull orange to dull, dull red. A million shades of dull red. There are craters, of course, all over Mars, but there's a particular concentration of them around Mars Six; conveniently, because that's why M6 was located where it was.

Joe Gold and I were discussing the whole kid sibling morsel about a year ago. "It's okay if one comes along when you're about five," I said. "Because then it's just another new little animal that moves and mews and looks funny and it's soft and warm. And it's okay if one comes along when you're fifteen, because then you can play surrogate papa. But—ten? No, Joe.

Altogether the wrong time, and I'd have told my ancients so, if they'd asked."

He agreed. We were out hunting sandies, and incidentally playing a mild game of chicken, with our airmakers turned down to three, for no better reason, I guess, than that five was the permissible minimum. Sandies are about as intelligent as an amoeba and represent the highest form of Martian life, but Eddy loved to follow their sloppy trails. In fact—

"Here comes Monster Child now," said Joe.

"Oh, no!"

I muttered and turned the maker up to seven, because with Eddy around you needed all the air you could get. He came lollaping along through the grit, waving and grinning and yelling. He hadn't been trailing sandies; he'd been trailing me. "I warned him," I said, grimly.

Joe gave me a quick look. "You going to lose him?" he asked. I nodded. The Monster had his gear freshly glopped up to look like mine, and you know how important it is when you're sixteen that your gear shouldn't look like anybody else's. Of course he'd mixed the glop wrong and the colors weren't right and the designs were sloppy and off balance, but that wasn't the point. The point was that he made me look silly. He even had his airmaker cocked at an angle in front of his gappy little

mouth, just like I had mine cocked. If he'd been born only five years later I wouldn't have cared about any of that, but we'd gotten off to a bad start, and so—

Only he couldn't get that into his head.

"I'm off back," Joe said, starting up. Our fathers are both engineers. Mars One through Twelve, which is all there are so far, are all located near crater clusters—big dips that go down kilometers each, conveniently cutting through the worthless surface grit down to paydirt. "Ah, no, Joe, don't go," I said.

"These scenes between you and Monster Child are no fun."

"Well, I warned him."

"Strictly you-two business . . . See you later."

A second smear against the M.C. No, a third. Copycatting me, following me, and now sending my compeer away. So when he got close enough, I gave him a clout on the capper and wiped the big cheer off his face.

"Pappa told you not to be so quick with your hands," he whimpered.

"So turn me in," I said.

"Suppose I was to get phixed?" he moaned.

"The word," I informed him, "is as-phyx-i-ated, and anytime you want to, go right ahead. And besides . . . Talking about quick with the hands. You put all that glop on your gear in about fifteen minutes. You were really in a

hurry to make a sandy out of me, weren't you?"

He'd started to smile when I said that about his being so quick with his own hands, but the smile slipped in a second. "I warned you," I said, starting to lope away. All he had to do, of course, was just turn and go back to our dome. But he wouldn't, he never would. He'd follow me and try to catch up and yell and slide and finally arrive long after me, smeary-eyed and worn out. I'd warned him.

"I wasn't trying to make a sandy out of you, Steve," he called out. "Wait for me, Steve! I just wanted to look like you, Steve. I like the way you look, Steve. Steve! Wait up? Wait up?"

So of course I loped faster. And tripped over my feet just on the edge of a junior crater I'd forgotten was there, and went toes over teakettle. It wasn't far down—just far enough for me to go out like moonset.

You ever tried being on Mars without an airmaker? Two minutes, and you're bursting out of your ears. Three, and everything is red, no matter where you are or what time of day it is. Four, and you're out. Five, and brain damage starts setting in. Ten, and you've been dead a while.

Now, of course, drill in gear-mending is second nature to all Marsmen. But, still, you talk about being quick with the hands? Consider: he had to catch up with me. The Monster Child, Eddy, I mean. And get to the bottom of the kitten crater, as we call it, the big ones being cat craters. And unscrew my airmaker, which was cracked by the fall. And reach in my gear for the spare. And find that it, too, was cracked by the fall . . .

How many minutes does that make?

And unscrew his. And screw it in place under my mouth.

He, of course, didn't have any spare. He was in too big a hurry to come out and play with me. He was too young to know better. I, of course, was too big to play. Sure.

I did everything I could when I came to, but it wasn't any use. The ancients were all cracked up, of course, and finally we sold the dome and moved here to Mars One, where they have everything, even a pool full of water just to swim in. I always wanted that, but I never go near it. Sometimes, though, I go out by myself and hunt sandies.

But I never put any designs at all on my gear anymore. Somehow, I don't know, I just couldn't stand to.



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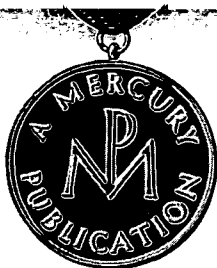
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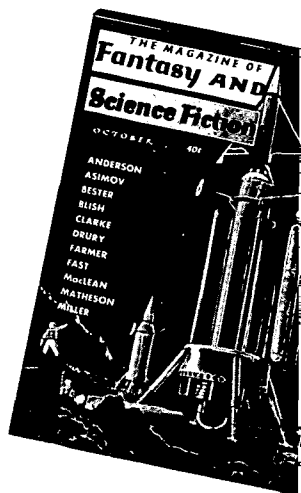


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